

DECLARATION OF J. BUFORD BOONE III

I, J. Buford Boone III, under penalty of perjury, declare and state as follows:

1. I am over the age of 18, have personal knowledge of the facts and events referred to in this declaration, and am competent to testify to the matters stated below.

2. I am enclosing a copy of my expert report in this matter as Attachment A, the contents of which are, to the best of my knowledge and belief, true and accurate, with the exception that there is a typographical error on page 3, paragraph 2, line 3 where “1988” should actually read “1998”. I hereby adopt and incorporate that report as if set forth fully herein.

3. I am qualified to provide expert testimony regarding ballistics and defensive uses of firearms in this matter. I am currently the owner and founder of Boone Ballistics, LLC. I am a retired Supervisory Special Agent (SSA) of the Federal Bureau of Investigation (FBI), where I worked from 1988 to 2012. I was the primary SSA with oversight of the FBI Ballistic Research Facility (BRF) from 1997 to 2012. The BRF has responsibility for testing and evaluating all ammunition, firearms, and body armor used operationally by the FBI. At the BRF, I:

- a. performed or directed all functions of the BRF, including overseeing all aspects of the BRF’s research;
- b. was the primary source of ballistic information regarding ammunition, firearms, and body armor for all FBI Agents;
- c. directed the creation of a procurement of 5.56mm NATO ammunition using piezoelectric conformal transducers for pressure testing;
- d. was the primary author of the FBI Body Armor Test Protocol and was the primary author of specifications for ammunition procurements (for both training and operational/“service” use) for the FBI;

- e. provided expertise to the Special Operations Community and helped the BRF form a strong liaison with the Department of Defense. In fact, the Department of Defense Law of War Chair, during my time of oversight of the BRF, established protocol that all new DOD small arms munitions required testing and evaluation by the FBI BRF prior to legal authorization being granted for their use;
- f. represented, at the request of the Department of Defense, the United States in Darligen, Switzerland in discussions of wound ballistics;
- g. provided numerous live-fire terminal ballistic demonstrations to local, state and federal law enforcement officers as well as to all branches of the United States Military;
- h. conducted international presentations on wound ballistics, ammunition selection, weapon selection, and body armor;
- i. briefed the Secretary of the Army and provided, at his request, my professional opinion of a 5.56mm NATO cartridge intended to replace the M855;
- j. functioned as the primary instructor of 40 Basic Law Enforcement Sniper/Observer schools (52 total: 6 before BRF assignment, 6 in retirement);
- k. earned the 2008 recipient of the National Defense Industrial Association Joint Armaments Committee's Gunnery Sergeant Carlos Hathcock Award; and
- l. authored the following publications at law enforcement or a governmental official's request:
 - i. Review of Accuracy 1st Training;

- ii. Weapon Selection – Revision III;
- iii. Ammunition Selection 2007;
- iv. TSWG MURG Briefing Accuracy Expectations;
- v. AIM III TSWG Briefing 3/16/2010;
- vi. Wound Ballistics; and
- vii. B2 Sniper Rifle Cleaning Method.

Prior to working in the BRF in 1997, I served as an FBI Special Agent in New Haven, Connecticut, beginning in 1988, where I became trained, qualified, and experienced as a Firearms Instructor in 1989. I was promoted to the position of Principal Firearms Instructor for the New Haven Division in 1992. I was promoted to Supervisory Firearms Instructor at the FBI Academy in Quantico in 1996. Before working for the FBI, I was a police officer with the Tuscaloosa, Alabama, Police Department. My detailed CV is included in Attachment A. I am intimately familiar with the matters of my testimony, which is based upon external sources as well as my own experience. My opinions were not developed for purposes of any expert testimony.

4. I was qualified as an expert witness in ballistics and terminal effects of small arms projectiles and provided in-court testimony in the Western District of Virginia [*U.S. v. Armet Armored Vehicles*, No. 4:12-cr-0021] on September 28, 2017. I have provided expert testimony in only one other case, *Kolbe v. O'Malley*, No. 1:13-cv-02841 (D. Md.) on January 2, 2014. My qualifications as an expert witness were not challenged in that case.

5. Semiautomatic rifles mischaracterized and defined by Massachusetts as “assault weapons”, particularly those based on the AR-15 platform, are well suited for defensive shooting—shooting use in defense of self, others, and home. Further, standard capacity

magazines (those for which the firearm was designed) are appropriate and potentially necessary for successful defense of oneself or home.

6. Put simply, semiautomatic rifles, including rifles based on the popular AR-15 platform, are among the best firearms for defensive shooting. Effective defensive shooting requires stopping the human aggressor as quickly as possible, and certain attributes of semiautomatic rifles make them the ideal firearm for defensive shooting. When properly selected, the ammunition for which AR-15 semiautomatic rifles typically are chambered (.223 caliber Remington or 5.56 NATO, which are very similar) is more effective and reliable at stopping human attackers than the best ammunition of handgun calibers typically used for defensive or law enforcement purposes. The penetration range of the aforementioned .223/5.56mm ammunition, as shown in testing conducted by the FBI and other agencies, is 12–18". This is the range which the FBI has determined is the most desirable for effectiveness.

7. Semiautomatic rifles of the AR-15 variety are among the easiest firearms to shoot accurately and are appropriate for close-quarter encounters. These rifles generally have the following additional characteristics which make them particularly suitable for defensive purposes:

- a. They are relatively lightweight;
- b. They are available with a telescoping/adjustable stock;
- c. They have a vertical pistol grip;
- d. They are semi-automatic and can be fired with one hand;
- e. They are chambered for cartridges that can be effective while having relatively mild recoil; and
- f. They utilize magazines with a standard capacity of 20 or 30 rounds.

8. Certain optional features available for semiautomatic rifles further enhance their suitability for defensive shooting. For instance, a telescoping/adjustable stock allows for a more compact overall size, thereby enhancing the user's ability to maneuver in the tight spaces of a home (though this feature does not contribute meaningfully to the concealability of the rifle as the adjustment range is typically only about three inches, which is enough to make a critical difference in maneuverability without significantly enhancing concealability). This feature also enables the firearm to be quickly adjusted to fit people of different statures. The vertical pistol grip design is easier to operate with one hand than traditional pistol grips. This can be of particular benefit when the user needs to use one hand to hold a flashlight or call 911. By contrast, pump, lever and bolt action firearms typically require two hands to function if more than one shot is required. Finally, the most common chambering used in AR-15 semiautomatic rifles is effective when the proper projectile is used, and its relatively mild recoil renders it easily mastered by persons of slight stature.

9. To conclude that the semiautomatic rifle is well-suited for defensive shooting, one need look no further than the fact that the AR-15 rifle is the most common rifle in use by American law enforcement (including the FBI), who may discharge their firearms for defensive purposes only.

10. Handguns, by contrast, are less effective firearms than semiautomatic rifles in defensive shooting situations for two reasons. First, handguns typically used for defensive purposes offer far less terminal effectiveness. Second, handguns are more sensitive to shooter technique and therefore are much more difficult to fire accurately than a semiautomatic rifle.

11. Semiautomatic rifles are superior to shotguns for defensive shooting for three reasons. First, effective shotgun ammunition has significantly more recoil than a 5.56 mm

semiautomatic rifle and is therefore more difficult to fire repeat shots accurately. It is a common misapprehension that the “spread” of shotgun pellets¹ make accuracy less critical when using a shotgun. This is not the case, as the most common defensive shotgun rounds, for instance a 00 buckshot used in a 2 3/4” 12 gauge shotgun, commonly spread beyond the scoring area of the FBI target, which is based on the size of a human torso, even when fired from a distance of only 21 feet. This means that the increase in hit probability is accompanied by the likelihood that some projectiles will miss. The increased probability of projectiles missing the intended target also increases the risk to unintended targets (innocent people). Second, shotguns typically have a capacity of between two and eight rounds, most commonly five. This inherently limits shotguns’ effectiveness in defensive shooting situations requiring more than two to eight rounds. Third, effective shotgun ammunition’s penetration range is unnecessarily deep, practically guaranteeing pass-thru shots, and posing considerable danger to others in the area.

12. A limit on a magazine’s capacity may hinder defensive shooting, as evidenced by the fact that nearly all law enforcement agencies, including the FBI, issue their officers magazines capable of holding more than 10 rounds of ammunition. To successfully survive a violent encounter, the FBI teaches its agents to fire until the threat is eliminated. There is no minimum or maximum amount of shots per subject. If a 30 round magazine is used and only one shot is required, the victim has stopped his attacker. If, however, a 10 round magazine is used and 12 rounds are required to stop the attacker(s), the victim could very likely be injured and might not survive. The best evidence of the appropriateness of magazine capacity can be found by looking at those issued by the FBI’s Defensive Systems Unit (“DSU”), which administers the FBI’s ammunition and firearms support for its operations personnel. The DSU issues 30 round

¹ A shotgun can fire multiple projectiles with each pull of the trigger. For instance, if 00 buckshot is used in a 2 3/4” 12 gauge shotgun, multiple (between 8 and 12) .32” lead balls are expelled with each shot.


magazines. In fact, I am unaware of any US law enforcement agency that issues AR-15 magazines of less than 20 round capacity. And, in my experience, 20 round magazines are the exception; 30 round magazines are the norm. It can only be concluded that US law enforcement believes that 30 round magazines are the most appropriate choice for defensive purposes when using an AR-15 rifle. Moreover, standard magazines for the currently issued FBI handgun (Glock 17 or 19) hold 17 or 15 rounds. The previous standard issue FBI handgun was the Glock 22. Its magazines held 15 rounds. During my time at the BRF, Glock manufactured a 10 round magazine for the Glock 22 pistol, but, to my knowledge, the FBI has never used the 10 round magazine. Nor am I aware of any law enforcement agency that issues pistol magazines that are restricted below standard capacity to some arbitrary limit like 10.

13. Firearms, by themselves, are rarely used to cause injury. Though there are instances of a firearm being used as an impact weapon, most injuries attributed to a firearm are more correctly attributed to a projectile launched by that firearm. Assuming similar launch velocity and barrel twist rate, a projectile launched by an AR-15 rifle is no more or less injurious than if launched by a bolt, pump, lever action or single-shot rifle. There is no scientific way to accurately characterize “wounds caused by an AR-15” as any more or less injurious than those caused by any other, similarly chambered, firearm.

14. Projectile design, in conjunction with the cartridge in which it is loaded, is the primary factor of effectiveness. All .223/5.56 cartridges are not equal. To characterize the .223/5.56 as “high power” ignores the fact that identical projectiles can be loaded to higher velocity in other cartridges. The .223/5.56 is not legal in some states for hunting whitetail deer while other (“more powerful”) cartridges, such as the .243 and above, are allowed.

15. With respect to the ability to quickly launch projectiles, it should be remembered that a shotgun, chambered for 3" 12ga, is capable of firing 41 supersonic projectiles of .24" diameter with each trigger pull.

I declare under penalty of perjury that the foregoing is true and correct.


J. Buford Boone III

12/12/2017
Date

J. Buford Boone III Boone Ballistics, LLC
P.O. Box 2370
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J. Buford Boone III currently is the member of Boone Ballistics, LLC and is a retired Supervisory Special Agent (SSA) of the Federal Bureau of Investigation (FBI). He was the primary SSA with oversight of the FBI Ballistic Research Facility (BRF) from April 15, 1997 – August 31, 2012.

Retired SSA Boone will offer opinions to a reasonable degree of firearm, ballistic, law enforcement and scientific certainty and will testify consistently with the contents of his report, below. Specifically, modern sporting rifles, particularly those based on the AR-15 series, are well suited for use in home defense. Additionally, that standard capacity magazines (those for which the firearm was designed) are appropriate and, potentially, necessary for successful defense of oneself or home.

Background and qualifications:

As the Member of Boone Ballistics, LLC, I have been employed as an expert witness in civil and criminal cases. Additionally, I have been employed as a consultant in civil and criminal cases. I teach internal, external and terminal ballistics, including selection of ammunition and weapons for efficiently incapacitating an aggressive human adversary. I have lectured on the applicability of the Hague Convention of 1899 to the selection of ammunition for use by the U.S. Military. I conduct time of flight testing to better document small arms projectile flight as it applies to the use of a Ballistic Coefficient to predict projectile impact at long distances.

Prior to my first full-time law enforcement employment, I served as a reserve police officer or Deputy Sheriff with Tuscaloosa County, Alabama, Upson County, Georgia, Las Animas County, Colorado and Trinidad Colorado.

Approximately May of 1988 I was hired as a Police Officer with the Tuscaloosa, Alabama, Police Department. I was subsequently offered a position as a Special Agent of the Federal Bureau of Investigation (FBI) in July of 1988. I began employment with the FBI on 07/25/1988. I was graduated from the FBI Academy on 10/21/1988. My first duty station was New Haven, Connecticut.

I have maintained an interest in firearms all my adult life. I have shot competitively. My firearms scores at the FBI Academy were sufficiently high to allow me to attempt the “Possible” Club. I was successful on my first attempt. To shoot a “Possible”, Agents must fire a perfect score on a very difficult course. Though there were in excess of 10,000 Agents in 1988, my “Possible” was approximately number 1,198 in FBI history.

Upon arrival in New Haven, I was assigned to the Reactive Squad conducting background, bank robbery and fugitive investigations. I later served as the Fugitive Coordinator for the New Haven Division. I was named “Detective of the Month” by the Bronx Homicide Task Force for the capture of an America’s Most Wanted fugitive.

I successfully completed FBI Firearms Instructor school in July of 1989. This qualified me to teach firearms to Field Agents.

I was transferred to the Organized Crime/Narcotics Squad in July of 1990. I primarily participated in investigations of drug gangs. These investigations typically involved significant amounts of surveillance, electronic monitoring and the service of multiple search warrants. I also participated in organized crime investigations. I have participated in multiple arrests in urban and suburban areas.

I was named the Principal Firearms Instructor (PFI) of the New Haven Division in November of 1992. I maintained that position until I transferred to the Firearms Training Unit at the FBI Academy, Quantico, Va.

As PFI, I oversaw all firearm and defensive tactics training of the 90+ Agents in the New Haven Division of the FBI. I coordinated training sessions for all firearms issued to general Agents.

This included revolvers, pistols, carbines and shotguns. It also included coordination of deadly force training with the Principal Legal Advisor. During my time as the PFI, the FBI transitioned from revolvers to semi-automatic pistols. The training for this transition was my responsibility for New Haven Division Agents.

In September of 1989 I was admitted to the FBI New Haven Special Weapons and Tactics (SWAT) Team as a Sniper/Observer. I successfully passed both the two week Sniper/Observer course and the two week Basic SWAT courses at the FBI Academy. I served operationally on the New Haven SWAT Team until my transfer to the FBI Firearms Training Unit at the FBI Academy, Quantico, Va.

In March of 1996, I was promoted to a position as a Term GS-14 Firearms Instructor at the Firearms Training Unit (FTU), FBI Academy, Quantico, Va. During this assignment, I performed line and PFI instruction of Agent trainees. I provided or oversaw line and combat instruction in handguns, carbines and shotguns. I also provided judgmental instruction utilizing Firearms Training Simulator (FATS) equipment. The FATS training was used primarily to teach Agents when the use of deadly force was appropriate, and when it was not.

I was transferred to the Ballistic Research Facility (BRF) of the FTU on April 15, 1997. I maintained my position at the BRF for more than 15 years, retiring on August 31, 2012. I received a permanent promotion to Supervisory Special Agent in September of 1997.

The BRF has responsibility for testing and evaluating all ammunition used operationally by the FBI. The BRF was created following a 1986 shootout wherein a subject was fatally injured by FBI projectiles but continued fighting and ultimately killing two Agents after receiving the "fatal" wound. A thorough investigation revealed the primary cause of the failure to rapidly incapacitate was the projectiles lack of sufficient penetration in the subject's body. It stopped short of the heart.

This investigation spawned research into the mechanics of wound ballistics. Ultimately, the research led to the creation of a scientifically repeatable method of comparing the potential effectiveness of individual cartridges. The resultant test has been referred to as the "FBI Method". The BRF published test findings available upon official request of Law Enforcement and Military agencies. The BRF became the most trusted source of ballistic information in the Law Enforcement and Military community.

As SSA of the BRF, my responsibility was to oversee all aspects of the research. I was the only full-time person at the BRF until a support person (non-Agent) was assigned as an Engineering Technician, Ballistics (ETB), in the last quarter of 1988. I was the Supervisor and rating official of the ETB.

As SSA, I performed or directed all functions of the BRF. I hand loaded cartridges, put test firearms together, hand-fired firearms for testing, built tissue simulant blocks, conducted penetration testing and reported on same. I created a relational database to store data and report test results. I operated sophisticated ballistic testing and photographic equipment. I was frequently sought out to train others in the use of this equipment.

I was the primary author of specifications for ammunition procurements for the FBI. This included ammunition used for training as well as for operational use, commonly referred to as "Service" ammunition.

I was the primary author of the FBI Body Armor Test Protocol.

I directed the creation of a procurement of 5.56mm NATO ammunition using piezoelectric conformal transducers for pressure testing.

The BRF served as the primary source of ballistic information regarding ammunition and firearms for all FBI Agents. Field Agents routinely referred local and state partners to me for ballistic information and advice.

During my service at the BRF, a strong liaison was formed with the Department of Defense (DOD). The BRF performed testing for and consultation with the DOD on many occasions. My expertise has been, and continues to be, sought out and relied upon by the Special Operations Community. During my service at the BRF, the Department of Defense Law of War Chair established protocol that all new DOD small arms munitions required testing and evaluation by the FBI BRF prior to legal authorization being granted for their use.

I have been a participant in a number of government sponsored Integrated Product Teams researching ballistics, such as:

- Joint Services Wound Ballistics
- Lead Free Ammunition
- Protective Armor
- Armor Piercing Ammunition development

In 2002, I traveled to Darligen, Switzerland, at the specific request of the Department of State, to represent the United States in discussions of wound ballistics.

I have provided numerous live-fire terminal ballistic demonstrations to local, state and federal law enforcement officers as well as to all branches of the United States Military.

I have conducted international presentations on wound ballistics, ammunition selection, weapon selection, sniper operations and body armor.

I have briefed the Secretary of the Army and provided, at his request, my professional opinion of a 5.56mm NATO cartridge intended to replace the M855.

I have functioned as the primary instructor of 51 Basic Law Enforcement Sniper/Observer schools. Approximately 962 students have successfully completed this course under my instruction.

I consistently received high performance ratings in the FBI. I received the highest possible, "Outstanding", each of the last 4 years of my service. I have received numerous letters of commendation and performance awards.

I was the 2008 recipient of the National Defense Industrial Association Joint Armaments Committee's Gunnery Sergeant Carlos Hathcock Award.

Publications authored during my FBI employment and restricted to Law Enforcement/Govt. official request:

- Review of Accuracy 1st Training
- Weapon Selection – Revision III
- Ammunition Selection 2007
- TSWG MURG Briefing Accuracy Expectations
- AIM III TSWG Briefing 3/16/2010
- Wound Ballistics
- B2 Sniper Rifle Cleaning Method

Publication authored during my FBI employment and publicly available:

- FBI Body Armor Test Protocol

The suitability of modern sporting rifles for home defense
J. Buford Boone III Boone Ballistics, LLC.
September 14, 2017

Examples of “Modern Sporting Rifles” should be expected to change over the years. There was a time when the only requirement for a rifle to be considered “Modern” was its ability to utilize metallic cartridges. “Modern Sporting Rifles” of 2013 include those that are magazine fed and semi-automatic (require the trigger to be moved from a starting point to a stopping point for each shot). Modern sporting rifles may resemble modern military rifles but possess at least one significant difference: they lack the ability to fire multiple shots with one movement of the trigger.

It has been common in the United States to adopt military rifles for sporting purposes. The Springfield bolt action rifles in use during World War I were routinely “sporterized”. The M1 Garand has seen extensive use in high power rifle competition, as has the M14 or its semi-automatic variant, the M1A.

For purposes of this discussion, rifles similar to the AR-15, despite their manufacturer or model variation, will be referred to as “AR-15” rifles. They may also be correctly referred to as “Modern Sporting Rifles”.

Self Defense

The appearance of increasing violence, especially “home invasion” type crime has many citizens concerned for the safety of themselves and their family. “Home” is supposed to be a safe place. It is a place you retreat to, not from. Firearms are commonly chosen, appropriately, as a crucial link in the home defense chain.

Defensive shooting is “shooting to stop”. It is not “shooting to kill”. While it is reasonable to believe that the use of a firearm might result in death, death is not certain. Stopping the attack is the goal. Death, if it occurs, is an unintended by product of the encounter.

Firearms, when used for defensive purposes, are actually used to compel an attacker to stop. Absent exact shot placement coupled with penetrating trauma, there is no logical method of calculating how many cartridges will be required to stop an attacker. Similar attacks may require vastly different numbers of shots as there is no reliable method of accurately estimating how determined the attacker will be or how he will react to being shot.

Wound Ballistics

Americans are exposed to violence, real or imagined, every day. It is reasonable to say that most Americans witness far more imagined than real violence. Entertainment, particularly television, movies and video games, is replete with fantasy examples of firearm effectiveness. The fantasy can and does create false expectations.

A common entertainment myth is the ability of a particular cartridge to cause immediate incapacitation, regardless of the situation. This can be referred to as a “magic bullet”. The general public has embraced these myths. A prime example is the number of people that

believe there are special cartridges that will immediately incapacitate a human being but will not penetrate the skin of a commercial airliner. As misguided as it may be, many decisions regarding firearms are founded on myths.

Firearms should not be counted on to stop aggressive human beings in the manner depicted in entertainment media. Though real life can, and sometimes does, mimic fantasy, it is not predictable.

Aggressive human actions can only be stopped by two methods, physical or psychological (or a combination of the two). Simply put, humans stop either because they want to or their body ceases to be able to support action. The reality is that there are no “magic bullets”.

Humans, physiologically, are similar despite who or where they attack. Accordingly, the parameters used by Law Enforcement in wound ballistic theory are applicable to all confrontations involving human beings.

The most important salient characteristic of any cartridge’s ability to be effective is the construction of its projectile. Comparing the terminal effectiveness of cartridges without specifying the projectile used is similar to attempting to compare vehicles simply by the number of doors they have. For example, while it may be reasonable to say a 4 door sedan accommodates more adults than a 2 door coupe, it is not reasonable to say that 2 door coupes are faster than 4 door sedans.

For a firearm to be physiologically effective, the projectile it launches must penetrate the subject’s body. The expected range of penetration is critical in deciding the appropriate firearm/ammunition to use. Wound ballistic research conducted by the FBI (Handgun Wounding Factors and Effectiveness, Urey W. Patrick, 1989) has determined that the most desirable range of penetration is 12” – 18” in human tissue. As a person’s physiology does not change according to what he is hiding behind or where he is encountered, this penetration range is appropriate for the majority of incidents of human aggression.

It is not uncommon for the penetration performance of a projectile to be influenced by intermediate barriers. Those without a firm foundation in ballistics would reasonably believe an intermediate barrier would decrease the penetration potential of a projectile. There are many instances, however, wherein a projectile’s penetration has actually been increased due to its reaction to an intermediate barrier. In these cases, the intermediate barrier acts to retard or completely prevent the projectile from expanding. Some hollow point handgun projectiles are particularly known for this type of behavior when encountering intermediate barriers typically found in home construction.

Fast moving, light handgun projectiles have been used in an attempt to lessen the possibility of “over-penetration” for defensive situations. While the logic appears sound, the results may be opposite of intentions. For example, a test I participated in at the BRF showed a particular 115 grain +P+ 9mm averaged approximately 11” in bare tissue simulant but approximately 29” in the same simulant after impacting ¾” plywood.

A projectile which performed similarly despite the presence or lack of an intermediate barrier would be referred to as “barrier blind”.

Law Enforcement

Average citizens require, and are entitled to, the same firearms, magazines and ammunition as law enforcement inasmuch as legally discharging a firearm at another human being requires the same litmus test...fear of death or grievous bodily harm to yourself or another.

It is an indisputable fact that the physiological makeup of a human being attacker is identical for attacks upon law enforcement officers and citizens protecting themselves. Therefore, the mechanism(s) required to immediately incapacitate aggressive human attackers are also identical.

There are no projectiles, cartridges or firearms which are more appropriate for stopping aggressive human actions against law enforcement officers than they are for a citizen protecting his home. The projectile is incapable of discriminating its terminal performance by classifying the person responsible for launching it.

Any attempt to provide more effective firearms systems, to include make, model, caliber and capacity, to any one group while restricting them to another is actually an attempt to place a higher value on the lives of the preferred group.

United States law enforcement agencies utilize firearms “in defense of self and others”. Police officers found to discharge a firearm at another person in other than defensive use are typically charged in criminal court. The same typically holds true for all citizens of the United States.

While it may be arguable that law enforcement officers use firearms as offensive weapons, this can only be supported by their presence being considered a deterrent. The appearance of a firearm is not consequential to its terminal performance. For example, a magazine which appears to hold 30 rounds of ammunition but actually only contains one round *may* be sufficient to encourage an attacker to submit. However, if that attacker does not submit, the appearance of the magazine will not prove beneficial in causing immediate incapacitation. Therefore, the *appearance* of the firearm may be considered offensive but *intentional discharge* of the firearm is strictly defensive.

The United States Department of Justice, in a memorandum dated October 17, 1995, issued a Policy Statement on the use of deadly force:

“Permissible Uses. Law enforcement officers and correctional officers of the Department of Justice may use deadly force only when necessary, that is, when the officer has a reasonable belief that the subject of such force poses an imminent danger of death or serious physical injury to the officer or to another person.”
(<http://www.justice.gov/ag/readingroom/resolution14b.htm>)

Based on my experience, the AR-15 rifle is the most common rifle in use by American law

enforcement.

The unit of the Federal Bureau of Investigation (FBI) with responsibility for purchasing and approving all firearms for operational use is called the Defensive Systems Unit (DSU). The FBI uses AR-15 rifles. Therefore, it can be inferred that the FBI believes the AR-15 is an appropriate firearm for defensive purposes. Though the FBI does not officially “endorse” any particular firearm that I am aware of, there could be no better endorsement than awarding a firearm a contract and making it a general issue item.

To successfully survive a violent encounter, the FBI teaches its agents to fire until the threat is eliminated. There is no minimum or maximum amount of shots per subject. It is as simple as realizing the aggressor is in total control of the situation. If shooting must occur, it will stop as soon as the aggressor stops his aggressive actions. Such a policy is the foundation of truly “defensive” use of a firearm.

It could easily be argued that fully-automatic rifles are appropriate for defensive purposes as most Federal and many State and Local law enforcement agencies issue fully-automatic rifles. The FBI actually had available, for general issue, a carbine with the ability to fire two shots with one trigger press. Though these carbines are being phased out, it is likely that there are still examples being used by field agents.

Magazine Capacity

Magazine capacity is an important consideration in any self-defense situation. It is difficult to imagine such a situation in which any rational person would desire a magazine of 10 rounds over a magazine of 11 rounds. Many believe the Hollywood myths of “one-shot-stops”. While it is true that some confrontations are stopped with one shot, it cannot be counted on.

If a 30 round magazine is used and only one shot is required, the victim has stopped his attacker. However, if a 10 round magazine is used and 12 rounds are required to stop the attacker(s), the victim could very likely be injured and might not survive.

The best evidence of the appropriateness of magazine capacity can be found by looking at those issued by the FBI DSU. Standard magazines for AR-15 rifles hold 20 or 30 rounds. Although 20 round magazines are readily available, the FBI issues 30 round magazines.

In all consultations I have had with US law enforcement agencies, I am unaware of ANY which issue AR15 magazines of less than 20 round capacity. In my experience, twenty (20) round magazines are the exception. Thirty (30) round magazines are the norm.

It can only be concluded that US law enforcement believes that 30 round magazines are the most appropriate choice for defensive purposes when using an AR15 rifle.

Additionally, standard magazines for the currently issued FBI handgun (Glock 17 or 19) hold 17 or 19 rounds. The previous standard issue FBI handgun, Glock 22, magazines held 15 rounds. During my time at the BRF, I am aware that Glock also manufactured a 10 round magazine for the Glock 22 pistol. To my knowledge, the FBI does not, and never has, issued

a Glock magazine with capacity restricted below the standard. Furthermore, I am not aware of any law enforcement agency that issues pistol magazines that are restricted below standard capacity.

It is interesting to note that FBI practice is to carry pistols “fully loaded”. This means a Glock 17 would have 18 (one in the chamber and 16 in the magazine) cartridges available when drawn from the holster.

During my time on the New Haven SWAT team, I was issued a Sig Sauer P226 pistol. Standard capacity magazines held 15 rounds. I was also issued 20 round magazines.

Based on my training and experience, the FBI has never advocated carrying less ammunition than your system was originally designed to use.

Handguns vs. Long Arms

Firearms come in many shapes and sizes. The cartridge used in the firearm reasonably places limits on the size of the firearm. Weapons that are designed to be held against the shoulder are commonly referred to as “Long Arms”. Typical examples of this are rifles and shotguns.

My training and experience in wound ballistics has shown me that handguns are the most convenient but least effective choice for self-defense. They are commonly used simply because their size renders them more concealable than a shoulder fired weapon. If the best choices are used in ammunition selection, handguns are typically far less terminally effective than rifles or shotguns. In addition, handguns are much more difficult to accurately fire than rifles or shotguns.

The Sporting Arms and Ammunition Manufacturers' Institute (SAAMI) is an association of the nation's leading manufacturers of firearms, ammunition and components. SAAMI was founded in 1926 at the request of the federal government and tasked with:

- Creating and publishing industry standards for safety, interchangeability, reliability and quality
- Coordinating technical data
- Promoting safe and responsible firearms use

SAAMI publishes ammunition standards in four classifications:

- Centerfire Pistol and Revolver
- Centerfire Rifle
- Rimfire
- Shotgun

It is not uncommon to find a shoulder-fired weapon chambered for “Pistol and Revolver” cartridges. It is also not uncommon to find a hand held firearm chambered for “Centerfire Rifle” cartridges. Generally speaking, and based on testing I conducted while employed by the FBI, the terminal effectiveness of a “Pistol” cartridge fired from a shoulder arm is not

substantially improved. In contrast, the terminal effectiveness of a "Rifle" cartridge fired from a short barreled handgun is frequently diminished, sometimes by a large margin.

While Rifle cartridges are typically more effective than handgun cartridges, it is quite possible to reverse this order by choosing a poorly constructed rifle cartridge and a well constructed pistol cartridge.

My observations of handguns, particularly pistols, shows they are typically more sensitive than long guns to shooter technique. Many pistols require a great deal of support to operate reliably. One of the most common explanations for pistol malfunctions is "Limp Wristing". This refers to the shooter not locking their wrist. This can induce malfunctions as the pistols are designed so that the slide moves back and forth on top of the frame. If the frame is also allowed to move rearward, the slide frequently does not travel its full distance and can fail to properly eject spent cartridges or pick up a fresh cartridge from the magazine. Modern, gas operated semi-automatic sporting rifles, using the proper ammunition, will usually function normally when fired with only one hand.

Additionally, I have witnessed that semi-automatic handguns are typically more sensitive to the addition of safety equipment such as an attached flashlight to aid in target identification or a laser to aid in aiming. I have received numerous reports of pistols failing to function when fitted with these devices. I have assisted with testing and documentation of these failures. I am unaware of any report of an AR-15 rifle that failed to function due to a properly mounted flashlight or laser.

There is little need to conceal a weapon in a home-defense situation. The mere presence of a weapon may be sufficient to cause the aggressor to go away. The goal, after all, is to compel the aggressor to leave you alone. Larger firearms are typically more intimidating than small firearms.

AR15 rifles, because of their commonality in both real life and the entertainment industry, are readily recognizable as effective defensive firearms. It is reasonable to believe that a criminal would be more intimidated by a homeowner with an AR15 than the same homeowner with a small frame 5-shot revolver. I have personally witnessed the immediate surrender of a known violent subject who later explained his actions as directly attributable to the imposing nature of the firearm I pointed at him.

Observations from 23 years as an FBI Firearms Instructor have shown that rifles and shotguns are easier to fire accurately than handguns. While I recall numerous failed qualification attempts with handguns, there were less with shotguns and a failure with the carbine or rifle was rare.

This is particularly notable in that both shotgun and carbine courses required shots at 50 yards while the pistol qualification course only required shots at 25 yards.

Because rifles and shotguns are typically easier to employ accurately, fire cartridges that possess the potential to be most effective and are more intimidating than handguns, it is my

opinion that they are among the most logical choice for home defense.

While shotguns have great potential for effectiveness, they are limited by the amount of recoil they generate and the number of cartridges they contain. Most shotguns utilized for home defense will have a capacity of between 2 and 8 rounds with the most common number being 5. Effective shotgun ammunition, typically buckshot or slugs, has a great deal of recoil and, therefore, can be more difficult to master than a 5.56mm carbine. Additionally, buckshot and slugs can be counted on to penetrate deeper than desired, practically guaranteeing pass-thru shots in a home defense situation.

Though buckshot is believed by many to have little chance of pass-thru, testing I participated in at the BRF showed that close shots (10') have resulted in deeper tissue simulant penetration than lead slugs. Despite empirical data to the contrary, there continue to be firearm "experts" that recommend buckshot as unlikely to "over penetrate".

Another consideration in the use of a shotgun is the shooter's responsibility for multiple projectiles with each press of the trigger. If 00 buckshot is used in a 2 3/4" 12 gauge shotgun, multiple (between 8 and 12) .32" lead balls are expelled with each shot. These projectiles spread as distance increases. During qualifications I witnessed, it was not uncommon for an agent to have one or more 00 buck pellets outside the scoring area of the FBI target. The 00 buckshot portion of the FBI Shotgun Qualification Course is fired at 21'.

In 1988, general FBI Agents had the option of two shoulder weapons, H&K MP5-SF and Remington 870. The MP5-SF is a semi-automatic carbine that fires 9mm handgun ammunition. Advantages of the MP5 over a handgun are that it is easier to shoot accurately, has a 30 round magazine and a more intimidating appearance. The Remington 870 shotgun used either 00 buckshot or rifled lead slug. The issued 870 magazine held four (4) rounds. While there were AR-15 rifles available at that time, they were normally used only by SWAT Agents or Firearms Instructors. The FBI later made MP10 carbines available to general Agents. These carbines utilized 30 round magazines and had a selector that included an option for "two round burst" (two shots with one trigger press).

The FBI began making AR-15 rifles more readily available following a procurement action conducted jointly with the DEA. The contract was awarded to Rock River, Colt and Sig Sauer in approximately December of 2003. The FBI has since begun to phase out the MP5. General policy has been to not repair broken MP5s, thereby removing them thru attrition. This can only be interpreted as the FBI believing that an AR-15 rifle is better suited to their defensive needs than a carbine firing a handgun cartridge.

FBI agents routinely use AR-15 rifles in arrest situations occurring in and around common housing structures. The FBI presentation I authored entitled "Weapon Selection" specifically demonstrates the appropriateness of using an AR-15 rifle for close quarters encounters.

While shotguns continue to be available to FBI Agents, my experience was that their popularity decreased first as MP5s became readily available and more so as AR-15 rifles were procured.

Based on my observations that the shotgun is not popular in a federal law enforcement agency with high physical standards, it is reasonable to believe that it is not the best overall choice for the average citizen.

The AR-15 rifle has characteristics that make it particularly suitable for defensive purposes:

- It is relatively lightweight
- It is available with a telescoping/adjustable stock It has a vertical pistol grip
- It is semi-automatic and can be fired with one hand
- It is chambered for cartridges that can be effective while having relatively mild recoil It utilizes magazines with a standard capacity of 20 or 30 rounds

Being lightweight, the AR-15 rifle can easily be mastered by persons of slight stature.

A telescoping/adjustable stock allows for a more compact overall size, thereby enhancing the user's ability to maneuver in the tight spaces of a home. Additionally, this feature enables the firearm to be quickly adjusted to fit people of different statures.

The vertical pistol grip design is easier to operate with one hand than traditional pistol grips, such as found on the Mini-14. This can be of particular benefit when needing to use one hand to hold a flashlight or call 911. Pump, lever and bolt action firearms typically require two hands to function if more than one shot is required.

The most common chambering, 5.56mm NATO/.223 Remington, has proven effective when the proper projectile is used. Additionally, its relatively mild recoil renders it easily mastered by persons of slight stature. It is recognized that there are differences between 5.56mm NATO and .223 Remington. For purposes of this discussion, however, the two should be considered substantially identical.

The standard magazine capacity provides a fair compromise between having sufficient ammunition without becoming unwieldy.

M.G.L.A. 140 § 121

Massachusetts General Law 141§121 and the July 20, 2016 Notice of Enforcement, are difficult to interpret even for someone with extensive firearms knowledge.

The definitions provided are confusing inasmuch as they are contradictory to some commonly held definitions.

The "Ammunition" definition includes individual components as well as assembled cartridges. The term "or" factually means any component, by itself, is "ammunition".

"Length of barrel" – Is more restrictive than the ATF definition as it does not include the chamber or permanently attached portions which do not contact the projectile.

“Machine gun” – Includes shotguns as they are capable of discharging “a number of shots or bullets” with “one continuous activation of the trigger”.

“Shotgun” – Merely describes a smooth bore rifle inasmuch as it speaks to the singular nature of “bullet” (synonymous with projectile). This use of the singular is contradictory to the ATF definition:

“A shotgun is a firearm designed to be fired from the shoulder and designed to use the energy of the explosive in a fixed shotgun shell to fire through a smooth bore either a number of projectiles or a single projectile for each pull of the trigger”.

Additionally, the scope, breadth and reach of the law, as explained in the Notice of Enforcement, retroactively places most owners of traditional 12 gauge single barrel repeating shotguns that were not lawfully possessed on September 13, 1994 in jeopardy of prosecution under the law. Conviction under this law would strip such a person of all 2nd Amendment rights, as per 18 U.S.C 922 (g).

As per the language in the law, these owners are in possession of at least a “Large capacity feeding device”.

Specifically, traditional single barrel repeating shotguns utilize a tubular magazine¹.

As defined by the Massachusetts law, these magazines are classified as a “Large capacity feeding device”.

Shotgun chambers are specified by gage and length. For example, 12 gauge 2 ¾” or 12 gauge 3”. The measurement provided in inches refers to the maximum length of an expended cartridge. SAAMI also shows a 12 gauge 3 ½” chambering.

The most commonly encountered shotgun cartridges in the USA are referred to as 2 ¾”. It is not uncommon, however, to encounter the 3” or 3 ½” chamberings.

My experience shows that the most commonly encountered tubular shotgun magazines for 2 ¾” and 3” chambered shotguns are designed to accept 4 cartridges of the maximum chamber length with some room remaining. Extended magazine tubes are readily available for many of these shotguns.

Aguila manufactures 12 gauge shotshells called “Minishell”. Their website lists the length as “1 3/4 inches”. This is likely the fired length as they also list 12 gauge 2 ¾” shells online.

A tubular magazine capable of holding 4 cartridges of the 2 ¾” chambering would likely hold 6 of the Aguila “Minishell” cartridges and, therefore, be prohibited under Massachusetts law.

¹ The Author recognizes that there are some repeating shotguns which utilize a box or rotary style magazine however, experience and a simple review of current and traditional offerings will show the overwhelming majority are fed from a tubular magazine.

Similarly, loading tubes designed to rapidly reload traditional shotguns are banned under this law.

Although the law states that firearms contained on the list specified in appendix A to 18 U.S.C. section 922 (many traditional semi-automatic shotguns) are not “assault weapons”, it does not remove the fact that they include a permanent “Large capacity feeding device”.

Inasmuch as the law says “an assault weapon or large capacity feeding device”, it prohibits the possession or transfer of these shotguns unless the magazine is removed and destroyed. Destruction of such a shotgun magazine would be difficult without also destroying the shotgun.

Notice of Enforcement

The language contained in the “Notice of Enforcement” actually increases the uncertainty of compliance with the law.

Most semi-automatic shotguns have “a pistol grip that protrudes conspicuously² beneath the action of the weapon. As previously shown, most 12 gauge semi-automatic shotguns also have “a fixed magazine capacity in excess of 5 rounds”. Therefore, unless specifically included on the referenced list, these shotguns are classified as “assault weapons”.

This makes it impossible to legally purchase any traditionally manufactured semi-automatic shotgun designed subsequent to the creation of the referenced list without prior verification that it is incapable of holding less than 6 rounds of the Aguila minishell ammunition.

One also is compelled to wonder what the effect would be of modifying an exempt weapon. For example, the Remington 1100 shotgun is specifically mentioned in the referenced list. I have handled and fired a Remington 1100 with a pistol grip and extended magazine. If a consumer purchased a pistol grip for an 1100, it would then be classified as an assault weapon. Would possession of such a firearm be prosecutable? Does it remain exempt?

When one goes to the website of the Massachusetts Attorney General, and accesses the link regarding “Guns That Are Not Assault Weapons”, one reads “Any Ruger Mini 14 or substantially-similar model weapon”. However, on the list of Appendix A to 18 U.S.C. section 922, one reads “Ruger Mini 14 (w/o folding stock). Which is correct?

The same website clearly lists “Any Springfield Armory M1A or substantially similar model weapon”. This weapon does not appear on Appendix A yet a review of the Springfield web page showing the “M1A Series” clearly shows it contains features that make it classified as an “assault weapon”, for example:

Detachable box magazine (15 and 20 round versions available)
Flash hider

² “Obvious to the eye or mind” – Merriam Webster online dictionary.

Pistol grip conspicuously below the receiver
Telescoping stock (some versions)

What is the definition of “substantially-similar”?

With respect to “a flash suppressor or threaded barrel designed to accommodate a flash suppressor”, how is one expected to determine the intended design of barrel threads. If a manufacturer states “Threaded to accommodate a compensator or silencer”, can the consumer legally believe that it was not designed to accommodate a flash suppressor?

In a review of Appendix A, one readily sees “Iver Johnson M-1 Carbine”. I know that the M-1 Carbine is a semi-automatic centerfire rifle and that common magazine sizes are 20 and 30 rounds. I also know that this firearm includes a “pistol grip conspicuously below the receiver”. I also know that this firearm has been available with a folding stock.

Copy or Duplicate section of the Notice of Enforcement:

The similarity test is oppressively broad. It potentially applies to any firearm which operates via a trigger press which releases a hammer to strike a firing pin. In other words, virtually all semi-automatic centerfire rifles which have the ability to accept a detachable magazine.

The interchangeability test mentions “receiver” in the singular. Although some firearms have one receiver, many have an upper and a lower. The Notice of Enforcement mentions parts which are contained in both the upper and lower. For example, the bolt carrier or bolt carrier group and the charging handle fit in the upper receiver of the AR series of rifles wherein the magazine port is integral with the lower receiver. The trigger assembly is installed in the lower receiver but the extractor or extractor assembly is installed in the bolt (upper receiver).

Although the AG Notice is intended to provide much needed guidance and clarity in negotiating the complexities of the law, the tests provided have the opposite effect. They actually expand the reach of the law, almost indefinitely. The result is that citizens, including firearms experts like myself, are unable to ascertain exactly what is prohibited and what is not.

I am charging \$700/hour for my consulting services.

A handwritten signature in black ink, appearing to read "J. Buford Boone III". The signature is fluid and cursive, with a stylized "J" and "B".

J. Buford Boone III
Boone Ballistics, LLC
Its Member

Detailed Curriculum Vitae – J. Buford Boone III

Updated 09/14/2017

Address: P.O. Box 2370
Tuscaloosa, Al. 35403
Phone: 540-446-9129
Email: Buford.boone@boonenewspapers.com

Education:

B.A., General Management, University of Alabama, 1984

Employment History:

| | |
|--------------------------|--|
| April, 2013 – Current | Reserve Deputy Sheriff, Tuscaloosa County, Alabama. |
| October, 2012 – Current | Boone Ballistics, LLC., Gainesville, Al. |
| 1985 – Current | Director, Boone Newspapers, Inc., Tuscaloosa, Al. |
| March, 1996 – Aug., 2012 | Supervisory Special Agent, FBI, Quantico, VA. |
| July, 1988 – March, 1996 | Special Agent, FBI. New Haven, Ct. |
| May, 1988 – July, 1988 | Police Officer, Tuscaloosa, Al. Police Department. |
| July 1987 – May, 1988 | Special Deputy Sheriff, Sheriff's Reserve, Tuscaloosa, Al., Sheriff's Department. |
| Nov. 1985 – July 1987 | Management trainee, Boone Newspapers, Inc. |
| January 1986 – July 1987 | Reserve Deputy Sheriff, Las Animas County Sheriff's Department, achieved rank of Sgt. |
| October 1986 – July 1987 | Reserve Officer, Trinidad, Co. Police Department. |
| July, 1984 – Nov., 1985 | Management trainee, Smith Newspapers, Inc. |
| Sept., 1984 – Nov., 1985 | Reserve Deputy Sheriff, Upson County, Ga., Sheriff's Department |

Boone Ballistics, LLC, Testimony given:

- I have testified as an expert in a deposition in *Kolbe v. O'Malley*, No. 1:13-cv-02841-CCB, in the U.S. District Court for the District of Maryland, on January 3, 2014.

Boone Ballistics, LLC, Research Conducted:

- BBLLC has a 1,500 yard precision measured (+/- .5") instrumented test range and has conducted numerous time of flight tests. This research is improving the understanding of projectile flight thru the transonic zone and the accuracy of predictions of that flight, particularly with respect to the appropriate application of ballistic coefficients.

Boone Ballistics, LLC, Consulting Performed:

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| July 2018 | Provided consultation in United States of America v. W. Joseph Astarita, U.S. District Court, District of Oregon |
| June 2017 | Provided consultation to Oehler Research during live-fire test/demonstration of time of flight measurement equipment they manufacture. |

CV of J. Buford Boone III, Principal Member of Boone Ballistics, LLC

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| June 2017 | Provided consultation in Marcus Underwood v. The City of Bessemer, U.S. District Court for the Northern District of Alabama. |
| Feb., 2017 | Hired by ammunition manufacturing company to assist in creation of specifications for ammunition using polymer case technology. |
| Jan., 2017 | Assisted Oehler Research in explaining the operation of their time of flight measuring equipment at the Shooting Hunting and Outdoor Trade Show. |
| Oct., 2016 | Hired as Expert Witness in Rodarte v County of San Bernardino |
| August, 2016 | Hired as Expert Witness in Meckl v CQT, et al. |
| Jan., 2016 | Assisted Oehler Research in explaining the operation of their time of flight measuring equipment at the Shooting Hunting and Outdoor Trade Show. |
| Dec., 2015 | Hired by law firm to assist in challenge to patent infringement by the projectile used in the M855A1 cartridge. |
| Nov., 2015 | Hired by large Australian Police Department to review a shooting incident, explain FBI theory and make recommendations on method of selecting ammunition for law enforcement operations. |
| Nov., 2015 | Assisted US SOCOM with specifications for long range barrier blind precision projectile and "Points of Light" to describe same. |
| May, 2015 | Provided on-site evaluation of ballistics lab for ammunition manufacturer. Provided training in proper setup and use of their pressure measurement systems. |
| Feb., 2015 | Hired by major law firm to provide expert opinion of facts relating to the ATF attempt to ban M855 ammunition as "armor piercing". |
| Dec., 2014 | Hired to consult with major ammunition manufacturer with regard to FBI ammunition Request for Proposal. |
| Dec., 2014 | Participated in beta testing of equipment designed to measure time of flight of projectiles at both supersonic and subsonic levels. Successfully recorded time of flight at 1 mile. |
| Oct. 2014 | Participated in beta testing of equipment designed to measure time of flight of supersonic projectiles. |
| Sept. 2014 | Assisted Tuscaloosa County Assistant District Attorney with ballistic information and cross examination questions for expert hired by defendant. |
| August 2014 | Hired to assist company with ballistics of man-marking projectile designs. |
| August 2014 | Hired by major ammunition manufacturer with regard to FBI ammunition Request for Proposal. |
| June, 2014 | Hired to provide expert opinions in Amicus filing in Jackson v. San Francisco. |
| June, 2014 | Consulted with Northport, Al., Police Department on firing range layout and construction. |
| May, 2014 | Provided ballistic testing consultation to USASOC, Fort Bragg, North Carolina. |
| April, 2014 | Hired to provide expert opinions on Amicus brief in New York State Rifle and Pistol Association, Inc., et al., v. Andrew M. Cuomo, et al., US District Court, Western District of New York, Buffalo Division. |
| March, 2014 | Hired by major firearms manufacturer to assist with ballistic explanations for US Department of Defense customer. |
| March, 2014 | Consulted with Tuscaloosa County Sheriff's Department on firing range layout and construction. |
| Feb., 2014 | Hired to instruct ballistic testing basics, velocity, accuracy and pressure, for new |

ammunition manufacturing company. Also hired to assist them in ordering of necessary equipment and setup of ballistic test lab.

Jan., 2013 Deposed as an expert witness in Kolbe v. O'Malley, U.S. District Court for the District of Maryland

Oct., 2013 Hired as expert witness in Kolbe v. O'Malley, U.S. District Court for the District of Maryland (Northern Division).

Aug., 2013 Hired as ballistic consultant for major ammunition manufacturer.

July, 2013 Consulted with major firearms manufacturer on medium caliber alternatives.

June, 2013 Consulted with Technical Services Working Group during live fire test of medium caliber cartridges, Fort Benning, Ga.

May, 2013 Provided ballistic consultation to a representative of the Asymmetric Warfare Group.

May, 2013 Participated in two conference calls with Technical Services Working Group regarding a medium caliber alternative for US military applications.

April, 2013 Participated in conference call with Technical Services Working Group regarding a medium caliber alternative for US military applications.

Jan., 2013 Hired as consultant in Speakman, Jared v. St. Petersburg Police Department.

FBI Assignments:

April, 1997 – Aug., 2012 Firearms Training Unit/Defensive Systems Unit - Supervisory Special Agent with oversight of the FBI Ballistic Research Facility.

March, 1996 – April, 1997 Firearms Training Unit - Supervisory Special Agent - Firearms Instructor.

May, 1995 – March, 1996 Principal Tactics Instructor, New Haven Division

Feb., 1995 – March, 1996 Principal Defensive Tactics Instructor, New Haven Division

Dec., 1992 – March, 1996 Principal Firearms Instructor, New Haven Division. Oversight of firearms training program of approximately 93 agents and 30 Task Force officers.

July, 1990 – March, 1996 Organized Crime/Drug squad (worked primarily on Joint Gang Task Force)

Sept., 1989 – March, 1996 Sniper on New Haven Division SWAT Team

April, 1995 Certified as Relief Supervisor

July, 1998 – Dec., 1992 Firearms Instructor, New Haven Division.

October, 1988 – June, 1990 New Haven Division Reactive Squad – Conducted background, bank robbery, property crime and fugitive investigations. Was fugitive coordinator at time of reassignment to OC/Drug Squad.

Training Received:

August, 2016 Attended SAAMI Ballistics Working Group, Jekyll Island, Ga.

May, 2016 Applied Ballistics Seminar, Dallas, Texas.

June, 2014 Ballistic Pressure Sensor User's Group Training, PCB Piezotronics, Buffalo, NY.

Aug., 2012 Continuity of Operations (COOP) Training.

May, 2012 Operation of digital imaging microscope.

March, 2012 Long range training at Accuracy 1st, Canadian, TX.

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| Nov., 2011 | FBI Security training. |
| Nov., 2011 | FBI Domestic Investigation Operational Guidelines training. |
| Aug., 2011 | Active Shooter Awareness Training. |
| May, 2011 | Long range rifle class, Accuracy 1 st , Canadian, TX. |
| May, 2011 | Discovery (legal) training. |
| April, 2011 | COOP Training. |
| March, 2011 | FBI Performance Management Training. |
| March, 2011 | Calibration of Piezoelectric Conformal Transducers. |
| Dec., 2010 | FBI Deadly Force Training. |
| Sept., 2010 | Armorer's Course on the M4 Carbine and 1911 pistol. |
| July, 2010 | FBI Firearms Instructor Recertification, Quantico, VA. |
| June, 2010 | Operation of a small metalworking lathe, Quantico, VA. |
| April, 2010 | FBI Cultural Diversity Training. |
| Dec., 2009 | FBI Ethics Training. |
| Aug., 2009 | LWRCI Armorer's Course, Quantico, VA. |
| July, 2009 | FBI training on Domestic Investigation Operational Guidelines. |
| Nov., 2008 | Govt. issued credit card training. |
| May, 2008 | FBI Diversity and Cultural Awareness. |
| Dec., 2007 | FBI Legal training. |
| Nov., 2007 | FBI Blood borne Pathogen training. |
| Sept., 2007 | FBI Performance Appraisal training. |
| May, 2007 | FBI Sentinel training. |
| Feb., 2007 | Terminating RG59 cables with BNC connectors. |
| Nov., 2006 | FBI Ethics training. |
| Dec., 2006 | FBI Firearms Instructor recertification. |
| Dec., 2006 | FBI Legal training. |
| Dec., 2006 | Equal Employment Opportunity training. |
| Oct., 2006 | NSB computer based training. |
| Sept., 2006 | FBI Hazardous Waste training. |
| March, 2006 | FBI Cultural Diversity Training. |
| March, 2006 | FBI Information Security training. |
| Dec., 2005 | Standards of Conduct training. |
| Dec., 2005 | FBI Legal training. |
| Nov., 2005 | Chandler Advanced Rifle III training, Moyock, NC. |
| Nov., 2005 | FBI Legal training. |
| Oct., 2005 | Blood Borne Pathogen, FBI Academy, Quantico, VA. |
| Sept. 2004 | Career Board Member, FBI Academy, Quantico, VA. |
| Aug., 2004 | Photoshop-CS Levels 1 and 2, Richmond, VA. |
| Sept., 2003 | GS15 Leadership Skills Assessment, Washington, DC. |
| Dec., 2003 | Informant training, FBI Academy, Quantico, VA. |
| Dec., 2003 | Standards of Conduct/Ethics, FBI Academy, Quantico, VA. |
| June, 2003 | Oehler Ballistic Testing Troubleshooting Workshop, Fredericksburg, Tx. |
| April, 2003 | FBI Cultural Diversity Training. |
| Nov., 2002 | FBI Deadly Force Training. |
| Nov., 2002 | Precision Rifle II, Blackwater, Moyock, NC. |

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| Aug., 2002 | Operation of the Stabalisor 3000 A1 return-to-battery fixture. |
| May, 2002 | FBI Legal Training. |
| May, 2001 | Contracting Officer's Technical Representative refresher training. |
| April 2001 | Oehler Ballistic Testing Workshop, Fredericksburg, TX |
| Aug., 2001 | FBI "Back to Basics" training. |
| June, 2001 | Contracting Officer's Technical Representative training, Quantico, VA. |
| Oct., 2000 | FBI Blood Borne Pathogen Training. |
| Sept., 2000 | Glock Armorer Recertification, Quantico, VA. |
| July., 2000 | FBI Deadly Force Training. |
| Dec., 1999 | FBI Drug Free Workplace. |
| Aug., 1999 | Advanced Firearms Instructor Training. |
| Nov., 1998 | FBI Legal Training. |
| Sept., 1998 | WordPerfect 8. |
| April, 1998 | Oehler Ballistic Testing Workshop, Fredericksburg, Tx. |
| Dec., 1997 | Contracting Officer's Technical Representative, Management Concepts, Vienna, VA. |
| Oct., 1997 | FBI Standards of Conduct. |
| July, 1997 | Glock Armorer Certification, FBI Academy, Quantico, VA. |
| May, 1995 | FBI Tactical Instructor Certification, FBI Academy, Quantico, VA. |
| May, 1995 | SWAT Specialized Team Training, FBI Academy, Quantico, VA. |
| Nov., 1993 | Hostage Rescue Team Selection, FBI Academy, Quantico, VA. |
| July, 1993 | FBI Firearms Instructor Recertification, FBI Academy, Quantico, VA. |
| July, 1993 | Oleoresin Capsicum Training and use. |
| 1992 | Informant Development In-service, FBI Academy, Quantico, VA. |
| 1991 | Basic Drug Investigator, FBI Academy, Quantico, VA. |
| Sept., 1990 | Basic SWAT Certification, FBI Academy, Quantico, VA. |
| May, 1990 | Observer/Sniper Certification, FBI Academy, Quantico, VA. |
| Aug., 1989 | General Police Instructor Certification, FBI Academy, Quantico, VA. |
| July, 1989 | FBI Firearms Instructor Certification, FBI Academy, Quantico, Va |

Awards Received:

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| Aug., 2012 | Certificates of appreciation, upon my retirement, from Naval Special Warfare, Development Group, USMC, |
| Aug., 2012 | Recognized as an honorary 2112 by the United States Marine Corps Weapons Training Battalion, Precision Weapons Section |
| June, 2012 | Appreciation for support to the Quantico Injured Military Sportsmen Association. |
| March, 2012 | Recognized by USASOC for 13 years of support and assistance provided. |
| March, 2012 | Service Award from Technical Services Working Group, Combating Terrorism Technical Support Office, Tactical Operations Section. |
| May, 2008 | National Defense Industrial Association Carlos N. Hathcock II Award. |
| Aug., 2006 | Cash award for efforts in identifying a better performing .223 caliber round for the U.S. Marine Corps entities assigned to combat roles overseas. |
| April, 2001 | FBI - Quality Step Increase Award. |
| July, 1997 | FBI "Time Off" award of 16 hours in recognition of superior service rendered to the FBI. |

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| Nov., 1996 | Letter of commendation from FBI Director for efforts in performance of official duties. |
| Sept., 1996 | Recognition of appreciation for contributions and dedicated service to the New Haven Organized Crime Drug Enforcement Task Force. |
| March, 1996 | Recognition of appreciation for working relationships with Connecticut State Police Statewide Narcotics Task Force (South Central Office), Connecticut State Police, United States Marshal Service |
| Dec., 1995 | Letter of commendation from FBI Director in recognition of performance in narcotics investigation. |
| Oct., 1995 | Departmental Award of Special Achievement, Department of Public Service, City of New Haven, for outstanding service to the department and citizens of New Haven thru the New Haven Gang Task Force. |
| April, 1995 | Performance Award in recognition of exceptional performance of official duties throughout the past year. |
| March, 1994 | FBI Performance Award in recognition and appreciation of exceptional performance of official duties throughout the past year. |
| June, 1994 | Cash award and letter from FBI Director in recognition of investigative efforts in connection with drug gang investigation. |
| Oct., 1992 | Cash award and letter from FBI Director in recognition of investigative efforts in connection with Interstate Transportation in Aid of Racketeering case involving street gangs. |
| Oct., 1990 | Policeman of the Month. Detectives Crime Clinic, Metropolitan New Jersey, New York and Connecticut. |
| June, 1990 | Cash award for capture of America's Most Wanted Fugitive |
| Oct., 1988 | FBI Possible Club, Member Number 1190. |

Training Provided:

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| June 2017 | Provided training in internal, external and terminal ballistics, weapon selection, wound ballistics and the way the law of war affects the selection of small arms munitions to the Special Weapons Forces 18B (Weapons Sgt.) committee, Fort Bragg, NC. |
| June, 2017 | Provided ballistics and marksmanship training to U.S. Govt. agency. |
| Jan., 2017 | Provided training on interior, exterior, wound ballistics and writing specifications for legally justifiable military projectiles to Naval Special Warfare Development Group Sniper Conference, Virginia Beach, Va. |
| Oct., 2016 | Provided ballistics and marksmanship training to U.S. Govt. agency. |
| Oct., 2016 | Conducted Basic Sniper Observer School. Tuscaloosa, Al. |
| August, 2016 | Provided ballistics and marksmanship training to U.S. Govt. agency. |
| May, 2016 | Provided interior, exterior and terminal ballistic instruction to Canadian Special Operations Forces Command. |
| March, 2016 | Provided ballistics and marksmanship training to U.S. Govt. agency. |
| Jan., 2016 | Provided training on interior, exterior, wound ballistics and writing specifications for legally justifiable military projectiles to Naval Special Warfare Development Group Sniper Conference, Virginia Beach, Va. |
| Oct., 2015 | Conducted Basic Sniper Observer School. Tuscaloosa, Al. |

Jan., 2015 Provided Wound Ballistics, interior ballistics and exterior ballistics training at Sniper Conference hosted by Naval Special Warfare Development Group, Virginia Beach, VA.

Oct., 2014 Conducted Basic Sniper Observer School. Tuscaloosa, AL.

Oct., 2014 Conducted basic carbine/patrol rifle training for Tuscaloosa, AL. Sheriff's Department.

June, 2014 Presented Accuracy Facts, Wound Ballistics and Exterior Ballistics at Sniper Conference hosted by Canadian Special Operations Forces Command, Ottawa, Canada.

May, 2014 Presented Wound Ballistics theory and selection of firearms and ammunition at the Indiana Tactical Officers Conference, Fort Wayne, In.

May, 2014 Provided interior, exterior and terminal ballistic instruction to Canadian Special Operations Forces Command.

Dec., 2013 Provided Wound Ballistics, interior ballistics and exterior ballistics training at Sniper Conference hosted by Naval Special Warfare Development Group, Virginia Beach, VA.

Nov., 2013 Conducted basic and advanced training for Tuscaloosa Sheriff's Department SWAT Snipers.

June, 2013 Conducted Sniper training for Tuscaloosa County Sheriff's Department SWAT Snipers.

April, 2013 Instructed Tuscaloosa Sheriff's Department SWAT Team in wound ballistics, weapon and ammunition selection.

Dec., 2012 Provided presentations on accuracy, ballistics (interior, exterior and terminal), common ballistic myths and wound ballistics at Sniper Conference hosted by Naval Special Warfare Development Group, Virginia Beach, VA.

Primary Instructor of FBI Basic LE Sniper School.

| <u>Month/year</u> | <u>Location</u> | <u>Students</u> |
|-------------------|-------------------|-----------------|
| Oct., 2016 | Tuscaloosa, AL | 21 |
| Oct., 2015 | Tuscaloosa, AL | 19 |
| Oct., 2014 | Tuscaloosa, AL | 14 |
| Sept., 2013 | Tuscaloosa, AL | 20 |
| Sept., 2012 | Tuscaloosa, AL | 15 |
| Aug., 2007 | Douglass, NV | 16 |
| June, 2007 | Beaver Falls, PA | 15 |
| April, 2007 | Tuscaloosa, AL | 21 |
| March, 2007 | Eglin AFB, FL | 15 |
| Sept., 2006 | Ft. Dix, NJ | 13 |
| April, 2006 | Tuscaloosa, AL | 19 |
| Feb., 2006 | Sacramento, CA | 23 |
| Oct., 2005 | Columbia, SC | 25 |
| May, 2005 | Blackstone, VA. | 23 |
| April, 2005 | Helsinki, Finland | 14 |
| March, 2005 | Tuscaloosa, AL | 22 |
| Feb., 2005 | Los Angeles, CA | 21 |

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| Oct., 2004 | Douglas, NV | 22 |
| Sept., 2004 | San Diego, CA | 16 |
| May, 2004 | El Paso, TX | 22 |
| April, 2004 | Tuscaloosa, AL | 24 |
| Feb., 2004 | San Antonio, TX | 17 |
| Oct., 2003 | Douglas, NV | 15 |
| Sept., 2003 | Simsbury, CT | 18 |
| Aug., 2003 | Quantico, VA. | 25 |
| May, 2003 | Alpena, MI | 27 |
| April, 2003 | Tuscaloosa, AL | 19 |
| March, 2003 | Los Angeles, CA | 20 |
| Sept., 2002 | Blackstone, VA | 21 |
| Aug., 2002 | Simsbury, CT | 16 |
| March, 2002 | Tuscaloosa, AL | 15 |
| Aug., 2001 | San Diego, CA | 11 |
| June, 2001 | Simsbury, CT | 18 |
| April, 2001 | Tuscaloosa, AL | 17 |
| March, 2001 | Blackstone, VA. | 28 |
| Feb., 2001 | San Antonio, TX | 26 |
| April, 2000 | Birmingham, AL | 17 |
| Jan., 2000 | Hattiesburg, MS | 28 |
| Aug., 1999 | Sacramento, CA | 10 |
| Feb. 1999 | Honolulu, HI | 21 |
| Jan., 1999 | Gainesville, FL | 19 |
| June, 1998 | San Diego, CA | 13 |
| April, 1998 | Columbia, SC | 20 |
| Feb., 1998 | Hattiesburg, MS | 22 |
| Sept., 1997 | Virginia Beach, VA. | 20 |
| March, 1995 | New Britain, CT | 16 |
| March, 1994 | New Britain, CT | 26 |
| March, 1993 | New Britain, CT | 17 |
| March, 1992 | Simsbury, CT | 15 |
| March, 1991 | Simsbury, CT | 16 |
| Sept., 1990 | East Haven, CT | 25 |

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|-------------|------------|-------------|--|-------------|------------|
| Aug., 2012 | May, 2012 | Aug., 2008 | Conducted terminal ballistic demonstration and discussion of appropriate methods of selecting ammunition and weapons, including live-fire of projectiles into tissue simulant with and without intervening barriers, for FBI Firearms Instructor Course. | | |
| Aug., 2012 | May, 2012 | March, 2012 | Oct., 2011 | Aug., 2011 | May, 2011 |
| March, 2011 | Nov., 2010 | Aug., 2010 | May, 2010 | March, 2010 | Oct., 2009 |
| Aug., 2009 | May, 2009 | Feb., 2009 | Dec., 2008 | Sept., 2008 | Dec., 2006 |
| Sept., 2006 | July, 2006 | Jan., 2006 | Nov., 2005 | Feb., 2005 | Nov., 2004 |
| Aug., 2004 | May, 2004 | July, 2003 | | | |

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|-------------|---|
| | Conducted terminal ballistic training and discussion of appropriate methods of selecting ammunition and weapons, including live-fire of projectiles into tissue simulant with and without intervening barriers, for FBI National Academy class. |
| June, 2012 | June, 2011 Jan., 2009 |
| | Conducted terminal ballistic training and discussion of appropriate methods of selecting ammunition and weapons, including live-fire of projectiles into tissue simulant with and without intervening barriers, for USMC Chief Warrant Officer (Gunner) course. |
| Feb., 2012 | Provided ballistics brief to the National SWAT Sniper Symposium in Reston, VA. Discussed FBI BRF creation, mission, wound ballistic theory, test method and ammunition/weapon selection. |
| Dec., 2011 | Provided overview of wound ballistics and projectile performance for USMC Plans Policies & Operations Unit at Henderson Hall, Arlington, VA. |
| Nov., 2011 | Presenter at the 57 th Allied Land Warfare Technical Intelligence Conference at the National Ground Intelligence Center, Charlottesville, VA. Presented on the FBI BRF creation and mission and FBI wound ballistic theory, test method and ammunition/weapon selection. |
| Oct., 2011 | Presenter at the USMC Combat Marksmanship Symposium. Presented on the FBI BRF creation and mission and FBI wound ballistic theory, test method and ammunition/weapon selection. |
| Oct., 2011 | Conducted terminal ballistic training, including demonstration and discussion of appropriate methods of selecting ammunition and weapons, including live-fire of projectiles into tissue simulant with and without intervening barriers, for DOD Director of Testing and Evaluation. |
| July, 2011 | Conducted terminal ballistic training regarding appropriate methods of selecting ammunition and weapons, including live-fire of projectiles into tissue simulant with and without intervening barriers, for FBI Field Firearms Program Manager Conference. |
| June, 2011 | Conducted briefing on wound ballistics and the FBI BRF for the Wounded Warrior visitors to the FBI Academy. |
| June, 2011 | Taught class on basic ballistics to HRT Sniper Team. |
| March, 2011 | Provided presentation on the FBI Ballistic Research Facility, FBI test method and wound ballistics to the Ammunition Initiatives Meeting III, hosted by the Technical Services Working Group in Tyson's Corner, VA. |
| April, 2010 | Provided ballistic training to FBI Principal Firearms Instructors conference. Topics covered included: FBI ammunition contracts, FBI Submachine gun program and UMP failure of same, New FBI Body Armor Test Protocol, identification of defective ammunition and FBI LE Basic Sniper School "Train the Trainer" program. |
| April, 2010 | Provided training to USMC Precision Weapons Section personnel on operation of the Phantom high speed video camera. |
| March, 2009 | Provided training on FBI wound ballistic theory, testing and ammunition/weapon selection to the Technical Services Working Group Ammunition Initiatives Meeting, Crystal City, VA. |

Oct., 2009 Instructor at Alabama Tactical Officer's Association. Classes taught included: Accuracy Expectations, Ammunition Selection, Body Armor testing - the FBI protocol and Weapon Selection.

Aug., 2009 Conducted terminal ballistics training on appropriate methods of selecting ammunition and weapons, including live-fire of projectiles into tissue simulant with and without intervening barriers, for DEA PFI conference attendees.

Oct., 2008 Provided presentation on FBI Body Armor Test Protocol at the Personal Armor Systems Symposium, Brussels, Belgium.

Aug., 2008 Provided training on high speed video equipment to FBI personnel.

July, 2008 Provided terminal/wound ballistics training, including live fire demonstration, for Technical Services Working Group and congressional representatives

May, 2008 Conducted terminal ballistics training regarding appropriate methods of selecting ammunition and weapons, including live-fire of projectiles into tissue simulant with and without intervening barriers, for FBI Principal Tactical Instructor's Conference attendees.

April, 2008 Conducted training on wound ballistics, ammunition and weapon selection for HRT operators.

Jan., 2008 Conducted terminal ballistics training on appropriate methods of selecting ammunition and weapons, including live-fire of projectiles into tissue simulant with and without intervening barriers, for FBI Firearms Instructor Course.

Aug., 2007 Douglas, NV June, 2007 Beaver Falls, PA

April, 2007 Tuscaloosa, AL March, 2007 Eglin AFB, FL

April, 2006 Tuscaloosa, AL

Aug., 2007 Sniper Instructor – "Train the Trainer"

July, 2006

Conducted terminal ballistics training on appropriate methods of selecting ammunition and weapons, including live-fire of projectiles into tissue simulant with and without intervening barriers, for Arabic Language Law Enforcement Executive Development Society students.

June, 2007 May, 2006 March, 2006 Aug., 2005 March, 2005 Oct., 2004

April, 2004 Oct., 2003 April, 2003 April, 2002 March, 2001 Jan., 2000

March, 1999 March, 1998

Provided Instruction on wound ballistics and live fire demonstration of gelatin penetration and velocity measurements of issued rifles for the USMC Scout Sniper Instructor Advanced Course.

Jan., 2007 Provided presentation on ammunition selection at Operational Tactics SWAT Sniper Symposium.

Aug., 2006 Provided ballistic training to FBI Principal Firearms Instructors conference.

July, 2006 Conducted terminal ballistics training on appropriate methods of selecting ammunition and weapons, including live-fire of projectiles into tissue simulant with and without intervening barriers, for Thailand major case seminar participants.

June, 2006 Conducted review of DOD partner's evaluation of 12.7mm Raufous (MK211) ammunition.

June, 2006 Met with Lt. Col from USMC Systems Command regarding ammunition testing th Ballistic Research Facility had completed for the USMC.

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|-------------|---|
| Sept., 2008 | April, 2007 May, 2006 June, 2004 Conducted terminal ballistic training and discussion of appropriate methods of selecting ammunition and weapons, including live-fire of projectiles into tissue simulatant with and without intervening barriers, for Latin American Law Enforcement Executive Development Society Students. |
| March, 2006 | Conducted terminal ballistic training and discussion of appropriate methods of selecting ammunition and weapons, including live-fire of projectiles into tissue simulatant with and without intervening barriers, for National Academy Associates. |
| Nov., 2005 | Conducted wound ballistics overview including ammunition and weapon selection for Virginia State Police Firearms Instructor Class. |
| Sept., 2005 | Provided presentation to FBI Principal Firearms Instructors. Topics included: Ammunition testing and high speed video evaluation showing the superior effectiveness of rifle and shotgun ammunition over handgun ammunition and the over-penetration potential of 00 buckshot if used for close quarters battle, the .223 ammunition contract award, how FBI ammunition procurements are conducted and explanation of .40 Smith & Wesson recoil issues compared to performance. |
| Aug., 2005 | Conducted terminal ballistic discussion and demonstration for Chief Medical Examiner of Maryland. |
| Aug., 2005 | Created and implemented training of newly assigned Engineering Technician, Ballistics. |
| July, 2005 | Conducted terminal ballistic discussion and demonstration for FBI Interns. |
| July, 2005 | Provided wound ballistics and cartridge/weapon selection briefing to head of Kuwaiti Firearms Training Unit. |
| June, 2005 | Conducted ballistic training for LAPD firearms officers. Training was centered on manufacture of gelatin, verification of validity, test methods, recording and reporting data. |
| Jan., 2005 | Provided presentation on Accuracy Expectations and Ammunition Selection Methods at National SWAT Sniper Symposium, Gaithersburg, Md. |
| Aug., 2004 | Provided Wound Ballistics presentation to FBI Principal Firearms Instructor Conference. |
| Jan., 2002 | Provided presentation on Weapon selection at the National SWAT Sniper Symposium, Gaithersburg, Maryland. |
| June 2001 | Provided ballistics training for DEA Firearms Instructor class. |
| Sept., 2000 | Provided ballistics training on selection of ammunition and firearms for DEA Firearms Instructor class. |
| Aug., 2000 | Provided general ballistics lecture and guidance in selection of ammunition and firearms for DEA Raid Instructor School. |
| June, 2000 | Provided training in ballistic testing and cartridge selection for DEA Firearms Instructor Class. Included live-fire demonstration. |
| Jan., 2000 | Bullseye training for HRT New Operators. |
| July, 1999 | Gelatin manufacture and test procedures for San Diego Sheriff's Department. |
| April, 1999 | Provided wound ballistics presentation to personnel from the Armed Forces Institute of Pathology. |
| March, 1999 | Presented class on shooting thru glass at the USMC Scout Sniper Instructor School. |
| June, 1998 | Provided presentations on defective ammunition and FBI shooting statistics to the |

FBI Principal Firearms Instructor Conference.
 Feb., 1998 Ammunition testing class provided for FBIHQ.
 Jan., 1998 Bullseye training for HRT New Operators.
 May, 1995 – March, 1996 Principal Tactics Instructor. Oversaw all “Street Survival” training for the New Haven Division of the FBI.
 Feb., 1995 – March, 1996 Principal Defensive Tactics Instructor. Oversaw all Defensive Tactics training for the New Haven Division of the FBI.
 Dec., 1992 – March, 1996 Principal Firearms Instructor. Oversaw all firearms training for the New Haven Division of the FBI.
 Dec., 1992 – March, 1996 Basic Concept of Special Weapons and Tactics Teams, Municipal Police Training Academy, Meriden, Ct. (approx. 8 times).
 Sept., 1989 – March, 1996 Assistant Instructor for approximately six (6) Basic 40-hour SWAT Schools
 July, 1989 – Dec., 1992 Firearms Instructor staff, FBI New Haven Division

Conferences Attended:

April, 2015 NRA Show, Nashville, Tn.
 March, 2012 Ammunition Initiatives Meeting IV, Tyson’s Corner, VA.
 Jan., 2012 SHOT Show, Las Vegas, NV.
 Sept., 2011 National Defense Industrial Association International Ballistics Symposium, Miami, FL.
 Sept., 2010 Personal Armor Systems Symposium, Quebec City, Canada.
 March, 2010 Ammunition Initiatives Meeting II, Crystal City, VA.
 Jan., 2010 SHOT Show, Las Vegas, NV.
 March, 2009 Ammunition Initiatives Meeting, Crystal City, VA.
 Oct., 2008 Personal Armor Systems Symposium, Brussels, Belgium.
 Feb., 2008 SHOT Show, Las Vegas, NV.
 Feb., 2006 SHOT Show, Las Vegas, NV.
 Jan., 2004, National SWAT Sniper Symposium, Gaithersburg, MD.
 Jan., 205 SHOT Show, Las Vegas, NV.
 Feb., 2004 SHOT Show, Las Vegas, NV.
 Feb., 2002 SHOT Show Las Vegas, NV.
 Oct., 2002 Ballistics Symposium, CCI, Lewiston, ID.
 July, 2000 Ballistics Symposium, CCI, Lewiston, ID.
 Jan., 2000 SHOT Show, Las Vegas, NV.
 Oct., 1998 Non-Toxic ammunition meeting, Indian Head, MD.
 July, 1998 Non-Toxic ammunition seminar, INS, Altoona, PA.
 Jan., 1998 SHOT Show, Las Vegas, NV.
 Feb., 1995 FBI Principal Defensive Tactics Instructor seminar, Quantico, VA.
 1995 FBI Principal Firearms Instructor Conf., Quantico, VA.
 1995 FBI Principal Tactical Instructor Conf., Quantico, VA.
 1994 FBI Principal Firearms Instructor Conf., Quantico, VA.
 1993 FBI Principal Firearms Instructor Conf., Quantico, VA.
 1990 FBI SWAT Senior Team Leader Conference, Quantico, VA.

Ballistic testing and Assistance provided to outside entities:

Note: This data comes from the best records available. It is not all-inclusive but is as complete as available records allow.

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|------------|------------|-------------|------------|------------|-------------|
| Aug., 2012 | May, 2012 | Dec., 2010 | July, 2010 | June, 2010 | Sept., 2009 |
| Jan., 2009 | July, 2009 | April, 2008 | May, 2007 | July, 2006 | April, 2006 |
| Aug., 2004 | July, 2004 | May, 2004 | Oct., 2003 | Feb., 2002 | Dec., 2001 |

- o Assisted Federal Game Warden with eradication of deer from airfield

Aug. 2012

- o Assisted HRT with concept and development of switch-barrel sniper rifle with both supersonic and subsonic capabilities. Project began in Feb., 2011.
- o Participated in research and development of .300 BLK loadings (both super and sub-sonic). Project began in Feb., 2011.
- o Conducted accuracy testing of effect of overall length on the accuracy of Federal 62 gr. 5.56 contract loading.
- o Participated in testing for FBI Body Armor Procurement.
- o Conducted liaison with other Government agency at their headquarters.
- o Conducted gelatin test of German ammunition for DOD advisor.
- o Met with United States Secret Service Special Operations Division Counter Action Team representative to discuss FBI wound ballistic theory, test method and selection of ammunition and weapons for law enforcement use.

July, 2012

- o Participated in conference call with ammunition manufacturer to discuss issues experienced with their ammunition.
- o Met with TSWG and HRT to view prototype Sniper Status System concept demonstration.
- o Met with HRT Snipers to discuss sniper spotting scope with integral atmosphere and ballistic data.

June, 2012

- o Participated in .40 S&W procurement testing for Service, Training, Training Reduced Lead and Frangible ammunition.
- o Assisted USASOC presenter during Wound Ballistics presentation to JSOC Command SgtsMaj. Conference.

June, 2012

- o Traveled to Fort Bragg to film gelatin shots for USASOC and to be recorded explaining wound ballistics for a video training series for their continuing education section.

May, 2012

- o Captured high speed video of muzzle flashes with various muzzle breaks and silencers for HRT.
- o Consulted with HRT PFI on wound ballistics and accuracy.
- o Traveled to Rapid City, SD., to tour Black Hills Ammunition and participate in long range rifle testing/training with members of USASOC.
- o Met with Training Division executive management team. Provided tour of BRF and described its creation and mission. Conducted terminal ballistic demonstration and

CV of J. Buford Boone III, Principal Member of Boone Ballistics, LLC

discussion of appropriate methods of selecting ammunition and weapons, including live-fire of projectiles into tissue simulant with and without intervening barriers. Also demonstrated FBI body armor test protocol and effectiveness of FBI issued body armor.

- Represented the FBI at the TSWG Next Generation Combat Rifle symposium in Altoona, Pa.

April, 2012

- Met with USASOC personnel and Jeff and Kristi Hoffman, Black Hills Ammunition, to discuss test methods and terminal performance standards.
- Participated in repeatability test of silencers for HRT.
- Met with United States Marshal Special Operations Group, to discuss FBI wound ballistic theory, test method and ammunition/weapon selection for law enforcement applications.
- Met with Hays Parks, DOD, to discuss a particular cartridge and its application for USASOC.
- Conducted HS video of obstructed bore test of three rifles for USMC.

March, 2012

- Conducted test of a ballistic shield for SWAT.
- Conducted high speed video of gelatin impacts.
- Met with Bryan Litz and Eric Stecker of Berger Bullets to discuss projectile design, test methods and terminal performance specifications.
- Hosted USASOC Sgt. Maj. for gelatin testing and high speed video of weapons firing.

Feb., 2012

- Conducted .40 S&W gelatin tests. Conducted high speed Video of Glock Gen 4 modified ejectors.
- Conducted Gelatin test of .300 BLK loads.
- Conducted accuracy and velocity testing of .40 S&W samples.
- Conducted gelatin and frangibility testing of .40 S&W cartridges produced by Winchester's Oxford, Ms., facility.
- Conducted post 2k round accuracy test of 7.62 carbines.
- Conducted test of ballistic plates.
- Hosted demonstration and familiarization fire of unique (classified) rifle brought over by the Laboratory Division.
- Provided ballistic consultation to the SWAT Operations Unit.
- Tested current production .40 S&W against procurement samples of .40 S&W.
- Provided ballistic consultation to USASOC.
- Tested subsonic ammunition for HRT.
- Shot ESAPI plates for the USMC WTBN.
- Hosted USMC Scout Sniper Instructor School to discuss long range ballistics.
- Shot accuracy, velocity and obstructed bore test of the Rock River .40 S&W carbine.

Jan., 2012

- Attended meetings at SHOT Show in support of USASOC.
- Assisted other Government Agency with respect to body armor.
- Created foil trigger screens for the Oehler M35P chronograph. Testing against M35 skyscreens showed it to be accurately recording velocity.

Dec., 2011

- Assisted HRT with high speed video of shooting thru glass.

Nov., 2011

- Consulted with USASOC at Fort Bragg.
- Assisted Hays Parks, DOD, in identifying differences between GameKing and MatchKing projectiles.

Oct., 2011

- Met with representative of Alcohol, Tobacco, Firearms and Explosives to assist in diagnosis of ammunition issues experienced by their agency.
- Conducted test of body armor in presence of manufacturer.
- Took aerial photos of the BRF and FBI Academy range complexes.
- Consulted with Tuscaloosa Metro Homicide on the possibility of a 9mm projectile penetrating sufficient tissue, if fired from approximately 417 yards, to cause a death. Researched the most probable cartridge used in the homicide, conducted test shots into gelatin at 420 yards and also downloaded projectiles to simulate extreme ranges. Reported results of testing for use in criminal prosecution.

Sept., 2011

- Consulted with personnel from other Govt Agencies on body armor and penetration potential of uncommon cartridges.
- Conducted testing at BRF for USASOC, including high speed video.
- Hosted meeting with manufacturer of triggers for Colt pattern carbines.
- Met with USMC Range Control personnel to discuss possible BRF range improvements.
- Consulted with USASOC at Fort Bragg.

Aug., 2011

- Assisted USASOC with first article testing (accuracy) of 7.62 battle rifle at Knight's Armament, Titusville, Fl.
- Conducted testing of Rock River .40 S&W pistols.
- Performed as a voting member on Career Board for Firearms Training Unit SSA position.
- Performed gelatin testing of .308 ammunition.
- Performed temperature extreme testing of Rock River pistols.

July, 2011

- Conducted High Speed video of FBI Sniper rifles and Night Vision Mounts.
- Consulted with USASOC at Fort Bragg.
- Represented the FBI in the Technical Services Working Group Joint Medium Caliber Working Group meeting at Harpers Ferry, West Virginia.
- Provided consultation to DEA FAST Unit regarding .308 rifles and .338 Lapua Mag rifles.

June, 2011

- Consulted with U.S. Department of Commerce (DOC) regarding catastrophic failure they experienced with LWRC 6.8 PSD. Participated in meeting between the DOC, LWRCI and the ammunition manufacturer to attempt to identify the cause of the failure.
- Consulted with Texas Rangers SWAT Team Captain regarding wound ballistics and ammunition/weapon selection for law enforcement applications.

April, 2011

- Consulted with Technical Services Working Group and Special Operations forces on ballistic instrumentation to record velocity and Ballistic Coefficient. Conducted high speed video of weapon systems while firing.

May, 2011

- Experimented with wireless communication systems for Oehler M83 system.
- Tested prototype compact sniper rifles.
- Shot high speed video of .308 rounds thru automobile glass.
- Tested prototype compact sniper rifles.

April, 2011

- Conducted test of firing pin damage in Glock pistols.
- Conducted test of firing pin damage in Glock pistols, met with Gunsmiths to discuss results.
- Conducted chronograph and Oehler M83 ballistic computer training for SSA assigned to replace me upon my retirement.
- Reorganized chronographs and tested multiple systems.
- Participated in "Counsel of Colonels" meeting on medium caliber issues.
- Conducted gelatin test of .300 Blackout 110gr. TSX.
- Captured high speed video of flex of FBI Sniper rifle mounts during recoil.
- Conducted load development of .300 Blackout ammunition.

March, 2011

- Attended demonstration of acoustic target system.
- Shot accuracy test of .308 carbines for DSU enhanced range carbine program.
- Consulted with DHS National Firearms Unit personnel on FBI test methods, high speed video and ballistic research.
- Consulted with USASOC representatives to discuss FBI wound ballistic theory, ammunition test methods and cartridge/weapon selection for military purposes.
- Conducted accuracy testing of AB39 ammunition for HRT.
- Conducted velocity measurements for HRT.
- Consulted with United Kingdom Ministry of Defence regarding FBI wound ballistic theory, ammunition test method and cartridge/weapon selection for military applications.
- Traveled to Fort Bragg to assist USASOC in function test of 5.56 weapon systems. Provided consultation regarding ballistic test methods, measurement of velocity, group size and ballistic coefficient using Oehler M85, M57 and acoustic target. Also consulted on terminal and exterior ballistics.
- Met with representatives of the FBI Engineering Research Facility to discuss measurement of firearm reports and possible methods of locating the firearm/shooter acoustically.

Feb., 2011

- Conducted high speed video of buckshot impacts in gelatin for FBI Laboratory Firearms Toolmarks Unit.
- Conducted 100 yard gelatin testing of ammunition fired from HK416C.
- Met with USMC PWS personnel to discuss ballistic test methods.
- Meet with USASOC representatives to discuss FBI wound ballistic theory, ammunition test method and cartridge/weapon selection for military purposes.
- Assisted HRT with concept and development of switch-barrel sniper rifle with both supersonic and subsonic capabilities.

Jan., 2011

- Conducted body armor test for HRT.
- Conducted pressure test of .40 S&W ammunition.
- Accompanied DOD JAG personnel to witness live fire testing and provide terminal ballistic

opinion on MK211 Raufoss ammunition impacting ballistic gelatin at Aberdeen Proving Ground, Md.

- Consulted with Montgomery County, Md., SWAT regarding the Discovery Channel Headquarters incident where an individual with a bomb took hostages. The incident ended in a tactical assault and shooting. Consultation was related to the performance of the ammunition used by the SWAT Team.
- Conducted velocity measurements for HRT.
- Conducted accuracy test of .308 ammunition.
- Met with representative from United Kingdom Home Office Scientific Development Branch regarding FBI wound ballistic theory, ammunition test method and cartridge/weapon selection for law enforcement applications.
- Shot velocity test of .40 S&W ammunition.
- Met with representative from Danish Institute of Forensic Medicine regarding FBI wound ballistic theory, ammunition test method and cartridge/weapon selection for law enforcement applications.

Dec., 2010

- Met with HRT Sniper Team Leader to discuss 7.62 carbines.
- Attended debriefing of USMC testing of 5.56mm NATO M855A1 and SOST.
- Conducted gelatin test of 6.8x43 110gr. Accubond.
- Conducted velocity measurements of HRT rifles.

Nov., 2010

- Consulted with USASOC at Fort Bragg regarding ballistic test methods, measurement of velocity, group size and ballistic coefficient using Oehler M85, M57 and acoustic target. Also consulted on terminal and exterior ballistics.

Oct., 2010

- Observed New Agent trainee firearms training using 5.56mm NATO contract ammunition. Documented and investigated malfunctions experienced.
- Met with Training Division Assistant Director and Deputy Assistant Director. Provided tour of BRF and described its creation and mission. Conducted terminal ballistic demonstration and discussion of appropriate methods of selecting ammunition and weapons, including live-fire of projectiles into tissue simulant with and without intervening barriers. Also demonstrated FBI body armor test protocol and effectiveness of FBI issued body armor.
- Participated in presenting overview of Defensive Systems Unit to FBIHQ personnel.
- Provided debriefing of successful competitor in 5.56mm NATO ammunition procurement.
- Provided debriefing of successful competitor in 5.56mm NATO ammunition procurement.
- Investigated and documented malfunctions experienced with 5.56mm NATO ammunition.
- Spoke at Pentagon retirement ceremony of USDOD Senior Associate Deputy (General Counsel International Affairs) W. Hays Parks.

Sept., 2010

- Met with Olympus representatives for demonstration of their high speed video systems.

Aug., 2010

- Hosted meeting to discuss 5.56mm NATO ammunition submissions.
- Conducted gelatin, accuracy and muzzle flash tests of 5.56mm NATO ammunition submissions.

July, 2010

- Provided consultation to HRT with respect to short barrel 5.56 carbines and the expected effect on the terminal performance of currently issued ammunition.
- Hosted DOD personnel to shoot LaRue OBR rifles.
- Participated in teleconference of Ammunition Working Group.
- Conducted vest test for Pennsylvania State Police.

June, 2010

- Hosted employees from Dayton T Brown engineering and testing laboratory to discuss and demonstrate FBI wound ballistic theory, test method and selection of ammunition and weapons for FBI use. Also discussed and demonstrated FBI Body Armor Test protocol.
- Conducted velocity measurements for HRT.
- Observed New Agent trainees firearms training. Documented and investigated malfunctions experienced.

May, 2010

- Hosted ballisticians from projectile manufacturer to discuss FBI wound ballistic theory and ammunition test methods.
- Met with ammunition manufacturer engineers and conducted ammunition testing.
- Attended meeting with USASOC and manufacturer of Oehler ballistic measurement equipment to discuss potential improvements in data acquisition.
- Provided training on Oehler ballistic instrumentation to USASOC personnel.
- Conducted gelatin test of MP7 for HRT.

April, 2010

- Attended live fire rehearsal for congressional demonstration by the USMC.
- Discovered postings on an internet forum which jeopardized security of DEA personnel in Afghanistan. Alerted DEA of their existence.
- Participated in teleconference of the Ammunition Working Group.
- Conducted pressure and velocity testing of .223 ammunition.
- Conducted accuracy testing of 5.56 ammunition.
- Observed firing of modified ammunition, documented results and investigated any malfunctions which occurred.
- Conducted high speed video of primer setback.
- Custom loaded dud ammunition for use in undercover operation.

March, 2010

- Conducted high speed video of primer setback. Discovered and documented cause of breach face damage experienced in FBI and other pistols.
- Hosted Director of Research and Development of AAC Silencers for sharing of high speed video and lighting techniques and their application for ballistic testing.
- Designed, modified, retrofitted and tested chronograph setup in attempt to more accurately record projectile velocity.
- Constructed fixture to allow precise measurement of projectile time in the bore of a handgun barrel. Ultimately energized the fixture with a low voltage battery and recorded electrical changes via an oscilloscope, acoustic microphone and high speed video.
- Observed firing of new ammunition. Recorded, documented and investigated malfunctions experienced.
- Conducted pressure test of .40 S&W ammunition.

Feb., 2010

- o Conducted ballistic testing for USASOC.
- o Hosted meeting with ammunition and firearm manufacturer to observe firing of proposed ammunition modification for FBI weapons.
- o Conducted meeting with ammunition manufacturer representatives.
- o Conducted test of body armor for HRT.

Jan., 2010

- o Conducted high speed video of muzzle flashes for HRT.
- o Conducted pressure test of .40 S&W ammunition.
- o Conducted tour and terminal ballistic demonstration and discussion of appropriate methods of selecting ammunition and weapons, including live-fire of projectiles into tissue simulant with and without intervening barriers, for United States Air Force Major General.
- o Conducted accuracy testing of LaRue OBR.
- o Met with ammunition manufacturer to discuss issues experienced with their ammunition. Observed their technicians firing the ammunition in service weapons. Documented and diagnosed malfunctions.
- o Measured velocity of ammunition fired from rifles for HRT.
- o Participated in teleconference of Armor Piercing Ammunition Working Group.
- o Participated in teleconference with engineers of ammunition manufacturer to discuss observations from 01/07/2010 test.

Dec., 2009

- o Tested training ammunition in M4 carbines for Field Division (Norfolk) experiencing issues.

Nov., 2009

- o Conducted body armor test of wet vests.
- o Conducted troubleshooting and repair of Oehler acoustic target system.
- o Met with USASOC, Fort Bragg, NC.

Oct., 2009

- o Conducted gelatin test of Federal .223, 55gr. Trophy Bonded fired from an 8" carbine.
- o Assisted ATF with conducting accuracy testing of pistols for their procurement.
- o Conducted high speed video of simunition projectile impacts on safety glasses.
- o Conducted high speed video of demonstration of effect of bomb for criminal case in the New York Division.

Sept., 2009

- o Shot velocity test of frangible ammunition used by FBI field office.
- o Conducted high speed video for DOD entity.
- o Conducted high speed video training.
- o Conducted HS video of muzzle movement, tape over the muzzle of a sniper rifle and LWRC piston system function.
- o Shot ballistic test of protective vehicle.
- o Met with Federal Prosecutors to provide ballistic expertise with respect to a Federal prosecution.
- o Shot gelatin test of 64gr. Gold Dot in 8" barrel 5.56 carbine.
- o Met with Finnish SUPO officer to discuss FBI wound ballistic theory, test method and selection of ammunition and weapons for law enforcement applications.

- Shot armored vehicle in support of Federal prosecution.

Aug., 2009

- Conducted test of ammunition at extreme temperatures for USASOC.
- Shot gelatin test of Winchester 10mm.
- Hosted Remington to demonstrate ACR and MSR rifles.

July, 2009

- Tested 5.56 carbine throat erosion suspected to be caused by ammunition.
- Conducted accuracy testing of .308 and .223 ammunition.
- Conducted body armor quality control test.
- Conducted accuracy and velocity test of .300 Winchester Short Magnum.
- Photographed carbine that had experienced catastrophic destruction.
- Conducted accuracy test of Winchester 10mm 180 grain bonded ammunition.
- Conducted test of Hornady SST Interlock .308 ammunition and Winchester 10mm 180 grain bonded when fired from an MP5-10.

June, 2009

- Met with USASOC at Fort Bragg to discuss wound ballistics and ammunition performance.
- Conducted Gelatin test of Barnes 110 gr. .308 projectile.
- Conducted ballistic plate test.
- Conducted accuracy test of HRT rifles.

May, 2009

- Met with USMC Weapons Training Personnel regarding ballistics.
- Met with members of Fairfax, VA. Police Department to explain FBI wound ballistic theory, test method and selection of ammunition and weapons for law enforcement use.
- Met with members of a DOD entity to discuss projectiles, explain FBI wound ballistic theory, test method and selection of ammunition and weapons for law enforcement use.

April, 2009

- Conducted gelatin test of Winchester 10mm ammunition.
- Participated in telephone call with United States Secret Service materials engineer regarding body armor and the FBI test protocol.
- Participated in first meeting of Military Body Armor Test Standardization program.
- Participated in numerous conference calls with ammunition manufacturer to discuss cause of defects experienced and proposed remedy.
- Conducted high speed video of Glock pistol function.
- Attended function testing of service ammunition.
- Conducted gelatin test of service ammunition and high speed video of Glock pistol function.
- Conducted accuracy test of training ammunition.

March, 2009

- Consulted with FBI Agent regarding test of armored vehicle.
- Met with CWO4 and Colonel from USMC to discuss FBI wound ballistic theory and test method.
- Met with DEA Firearms instructor to discuss Glock pistol function issues.
- Traveled to Aberdeen proving ground to witness test of 6.8x43 SPC against body armor.
- Met with Winchester Ammunition representatives to discuss ammunition issues.
- Conducted examination of LAPD pistols and provided guidance to their armorers with respect to likely cause of damage and logical next investigative steps.

- Met with US Customs and Border Protection representative to discuss the applicability of the .308 carbine to their mission.
- Conducted body armor quality control test.

Feb., 2009

- Shot glass test for FBI and DOD entities.
- Measured velocity of ammunition fired from rifles for HRT.
- Traveled to Kuwait and Afghanistan to exchange FBI equipment.

Jan., 2009

- Conducted body armor testing.
- Conducted tour and discussion of FBI wound ballistic theory and test methods for members of US DOD JAG.
- Conducted tour and discussion of FBI wound ballistic theory and test methods for Canadian Special Operations Forces.
- Conducted test of ballistic protective plate for US DOD.
- Shot function test of Glock 23 pistols with FTU personnel present.
- Shot vest test for U.S. Department of State.
- Conducted quality control testing of .40 S&W and 9mm ammunition.
- Met with HRT members to discuss potential effectiveness of personal defense weapons.
- Met with DOD personnel to discuss issues with M855.
- Participated in FBI Career Board.

Dec., 2008

- Conducted gelatin test of foreign threat ammunition.
- Conducted test of Sig Sauer P250 for DEA.
- Conducted obstructed bore test of Sig Sauer P250 for DEA.
- Attended briefing on Technical Services Working Group project.
- Met with USMC CWO4 to discuss terminal performance of M855LFS.

Nov., 2008

- Conducted training on high speed video equipment.
- Consulted with USASOC regarding wound ballistics and ammunition selection.
- Conducted test of SOST rounds for US DOD.
- Conducted test of ballistic plates.
- Conducted test of 4.6 for HRT.

Oct., 2008

- Conducted gelatin test of ammunition fired from HK MP7.
- Conducted accuracy test of HRT rifles.

Sept., 2008

- Conducted high speed video of rifle function.
- Hosted meeting of ATK representatives to discuss ammunition testing methods.
- Conducted test of Body Armor.
- Shot gelatin test of .223 Partition ammunition thru short barrel M4 carbines.
- Shot high speed video of HK416 function.
- Showed high speed video to H&K engineers. Shot additional video to diagnose 416 malfunctions.

Aug., 2008

- Conducted demonstration of potential for new munition to penetrate FBI issue body armor

and made request for Finance Division to provide funding for enhanced protection.

- Provided counsel to Office of Professional Responsibility Agent regarding the function of the M4 rifle.
- Attended meeting regarding 5.56 NATO ammunition procurement.
- Met with Department of State representative to discuss wound ballistics and ammunition selection.
- Shot ballistic protective plates.
- Conducted chronograph testing of HRT rifles.
- Conducted high speed video of gelatin testing and muzzle flashes for USASOC.

July, 2008

- Met with LAPD and New Smyrna, FL, PD executive officers to discuss FBI wound ballistic theory and proper ammunition and weapon selection.
- Conducted ballistic test of armored vehicle.
- Conducted testing of ballistic protective plates.
- Conducted body armor testing.
- Met with US AWG representatives to discuss high speed video, FBI wound ballistic theory, test methods and ammunition/weapon selection.
- Conducted high speed video for FBI Laboratory Firearms Toolmarks Unit.
- Met with USASOC personnel to discuss M855A1 5.56 NATO ammunition performance.

June, 2008

- Conducted high speed video of Glock 27 malfunctioning with the last two rounds in the magazine.
- Attended Quantico Action Response Group (ARG) meeting on "Direct Action" concept for TD and ARG mission for active shooter.
- Met with Secretary of the Army, in his Pentagon office, and JAG representative, to discuss M855 5.56 NATO ammunition.
- Conducted high speed video of Glock pistol malfunctions.
- Met with HRT Sniper Team Leader to discuss projectile trajectories and a computer program to predict them.
- Met with DOD Agent to discuss testing of ballistic protective vehicle.

May, 2008

- Hosted members of the Bureau of Alcohol, Tobacco, Firearms and Explosives to discuss FBI wound ballistic theory and test methods.
- Hosted meeting with representatives from DHS to discuss FBI wound ballistic theory and test methods.
- Tested protective steel plates and investigated cause of failures.
- Met with FBI Laboratory Agent to discuss testing of ballistic protective vehicle.
- Conducted testing to diagnose failures of ammunition.
- Conducted ballistic test of M855A1 for DOD.
- Drafted report of observations at Chicago range test.

April, 2008

- Participated in telephone call with USDOD Program Manager regarding the "green" M855 ammunition.
- Participated in telephone call with the Explosives Unit regarding armored car testing.
- Consulted with FBI Office of General Counsel regarding suit against the FBI Chicago firing

range.

- Conducted high speed video of tracer ammunition being fired into an earthen berm. This video was used in defense of a suit against the FBI Chicago firing range.
- Met with representatives from Remington Ammunition to discuss ammunition testing procedures.

April, 2008

- Met with Army Research Laboratory personnel to discuss new DOD 5.56 projectile.
- Conducted debriefing for Speer regarding ammunition contract.
- Hosted meeting with manufacturer to discuss helmet testing protocol.
- Conducted tour and discussion of BRF mission and method for USMC Body Armor program representatives and instructors from the Federal Law Enforcement Training Center.
- Met with FBI attorney from FBI Office of General Counsel to discuss defense of lawsuit over Chicago firing range.
- Toured Winchester ammunition plant, East Alton, Il.
- Traveled to Chicago, Il. To function as expert counsel to FBI during live fire test, ordered by Federal judge, at FBI firing range.
- Conducted body armor test.
- Participated in telephone call to consult on Chicago range test.

March, 2008

- Conducted ballistic test of DHS armored vehicle.
- Hosted Technical Services Working Group members to discuss demonstration.
- Met with US DOD personnel to discuss M855LFS.
- Shot high speed video of various cartridges impacting gelatin at 10' for inclusion in a composite video to demonstrate their potential effectiveness.
- Provided tour of BRF and hosted discussion of FBI test method and theory and live fire demonstration for members of Government partner agency.
- Shot high speed video of the function of a Glock pistol.
- Merged multiple high speed videos into a single video to demonstrate the potential effectiveness of various cartridges.
- Created a PowerPoint presentation to be given to HRT Operators to assist them in understanding the ballistic capabilities of FBI weapon platforms.

Feb., 2008

- Conducted terminal performance of ammunition test for USASOC.
- Conducted manufacturer debriefing for ammunition contract.
- Met with representative for manufacturer of ballistic material.
- Participated in conference call with the Colorado Bureau of Investigation regarding the catastrophic failure of a Colt pattern rifle. Provided information on logical investigation to pursue.
- Conducted velocity measurements for HRT Snipers.
- Participated in meeting to discuss considerations for formation of Rapid Response Team at the FBI Academy. Was subsequently named a Team Leader.

Jan., 2008

- Observed and recorded FTU instructors function test of 9mm frangible ammunition.
- Repaired PCB charge amplifier.

- Assisted HRT with explanation of .223 wound ballistics.
- Dec., 2008
- Photographed Springfield 1911 pistols which had experienced catastrophic failures.
 - Conducted FBI body armor test.
- Nov., 2007
- Conducted test of Body Armor for US Dept. of State.
 - Observed and recorded FTU instructors function test of 9mm RFP ammunition.
- Oct., 2007
- Conducted environmental testing of .40 S&W contract ammunition.
 - Met with FBI Office of General Counsel representative to discuss zylon as used in body armor.
 - Conducted pressure, velocity, accuracy and muzzle blast testing of 9mm RFP ammunition.
- Sept., 2007
- Conducted meeting on .40 S&W and 9mm ammunition contracts.
- Aug., 2007
- Provided tour of BRF and hosted discussion of wound ballistics and FBI test method and provided live fire demonstration for US DOD Judge Advocate General representatives.
 - Shoot SCAR light and heavy rifles for familiarization and to provide input regarding their function.
- July, 2007
- Assisted USMC with gelatin test of Simunition.
 - Provided tour and explanation of FBI ammunition test method for SSA from Counter Terror Division.
 - Hosted meeting with representatives from Corning to discuss ballistic glass.
- Feb., 2004 – June, 2007
- Core member of Blended Metal Technology Integrated Product Team evaluating the properties of new small arms ammunition. BRF examination proved the ammunition to be commercially available projectiles. Referred to criminal division for fraud against the government investigation.
- May, 2007
- Conducted gelatin test for Richmond Police Department.
 - Assisted Hazardous Materials Response Unit with chronograph, high speed video and still photography.
 - Conducted velocity measurements for HRT.
- April, 2007
- Conducted accuracy testing of MK262 Mod1 5.56 NATO ammunition.
 - Met with representative of major ammunition manufacturer to discuss ammunition malfunction issues.
- March, 2007
- Reviewed and provided comments on legal review for ammunition requested to be used by USASOC.
 - Reviewed ARDEC technical report on RBCD ammunition.
 - Met with representatives of Prince William, VA., Police Department to discuss ballistics.
 - Conducted pressure test of 12 ga. Breaching rounds.
 - Met with USMC Systems Command to provide consultation on creating a gelatin test

laboratory.

- Conducted velocity measurements of ammunition fired from HRT firearms.
- Assisted FBI Office of General Counsel with ballistic analysis of testimony to be given by expert witness.
- Shot test of ballistic plates.
- Hosted meeting with engineers and technicians of ammunition manufacturer to discuss ammunition and test procedures.

Feb., 2007

- Hosted personnel from HP White Laboratory to demonstrate BRF methods of high speed video capture.
- Participated in teleconference to discuss USSOCOM Blended Metal IPT final report.
- Conducted ballistic plate test.
- Conducted terminal ballistic demonstration and discussion of appropriate methods of selecting ammunition and weapons, including live-fire of projectiles into tissue simulant with and without intervening barriers, for FBI Laboratory Firearms Toolmarks Unit.

Jan., 2007

- Performed review of USSOCM Blended Metal IPT report.
- Provided expert opinion of Legal review of ammunition proposed to be used by USASOC.
- Attended meeting on USMC Alternate Ammunition test plan.
- Attended meeting regarding proposed build-out of HRT rifle range.
- Briefed FBI FTU personnel on Hazelton, Pa. Police Department shooting.
- Conducted meeting with Winchester ammunition representative.

Dec., 2006

- Met with DOD representatives to discuss ballistic research.
- Hosted members of Hazelton PD to discuss wound ballistics and likely reasons for their ammunition performance during an officer involved shooting. Conducted gelatin testing for to demonstrate FBI test method and wound ballistic theory.
- Hosted meeting with two Baltimore Police SWAT officers to discuss terminal ballistics, ammunition and weapon selection.
- Conducted gelatin test of M855 ammunition.

Nov., 2006

- Conducted high speed video of blood splatter test for FBI Laboratory.
- Conducted standard performance test of Federal .40 S&W EFMJ.
- Conducted test of ballistic plates for FBI.
- Conducted high speed video for FBI Explosives Unit and the USMC.
- Conducted meeting with Winchester Ammunition representative.

Oct., 2006

- Provided tour of BRF for US Department of State personnel. Discussion included FBI ammunition testing and procurement methods and how the USDOS could participate in FBI contracts.
- Hosted USMC High Risk Personnel instructors to discuss wound ballistics, ammunition and weapon effectiveness and selection.
- Conducted standard performance test of Federal 9mm EFMJ.
- Conducted body armor test.

Sept., 2006

- Hosted meeting with USMC Systems Command to discuss proposed Phase II testing for USMC alternate caliber program.
- Met with USMC Systems Command Major and engineer regarding 5.56 and 7.62 ammunition.
- Investigated and located source of FBI information leak over the internet. Reported the results of the investigation to FBIHQ.
- Calculated the maximum range of FBI munitions for FBI Norfolk to use during investigation of claimed projectiles escaping the range used for FBI qualifications.
- Explained to safety officials the mechanics of airborne lead when firing small arms ammunition and the proposed remedy for use in all-weather ranges.
- Provided tour of BRF and conducted demonstration of FBI wound ballistic test methods for medical Doctor consulting with the FBI.

Aug., 2006

- Conducted gelatin test of 6mm TSWG and H&K 4.6 PDW for USASOC.
- Provided professional consultation and guidance to Indiana State Police in the Investigation of a murder which involved a long-range rifle shot.
- Hosted demonstration of Glock G37 (.45 GAP).
- Conducted failure analysis of catastrophic destruction of M4 carbine.
- Conducted pressure and accuracy testing of frangible ammunition used during catastrophic destruction of M4 carbine.
- Recorded intentional catastrophic destruction of M4 carbine to aid in investigation.
- Conducted research and testing of film intended to make vehicle glass more resistant to projectile insults.
- Conducted pressure, velocity and function testing of .223 training ammunition sent in by Salt Lake Division and reported as suspected to be causing system malfunctions.

June, 2006

- Conducted velocity test and created ballistic charts for HRT rifles.
- Conducted meeting regarding FBI Body Armor Protocol.
- Attended less lethal options meeting at FBI Critical Incident Response Group.
- Conducted gelatin test of Winchester .308 Ballistic Silvertip.

May, 2006

- Conducted gelatin test for USASOC.
- Conducted troubleshooting investigation of Nikon D2H camera used at BRF.
- Conducted high speed video of disruptor used to counteract improvised explosive devices.
- Conducted debriefing of H&K personnel on the failure of the UMP during acceptance testing.
- Troubleshoot and reset Viatran voltage meter on piezoelectric conformal transducer calibration equipment.

April, 2006

- Assisted Henrico County, VA. with diagnosis of pistol malfunctions they were experiencing when utilizing weapon-mounted lights.
- Served as ranking member on Career Board for vacant SSA position.

March, 2006

- Met with USMC to discuss appropriate plan for ammunition test they requested the FBI BRF conduct.

- Assisted USMC with measuring and calculating Minute of Angle adjustments of SR25 rifles.
- Conducted tour and discussion of wound ballistics and ammunition/weapon selection for 5th Special Forces (Airborne) Master Sgt.
- Conducted tour and discussion of wound ballistics and ammunition/weapon selection for Police Chief from Alexander City, AL.
- Conducted tour and discussion of wound ballistics and ammunition/weapon selection for visiting police officer.
- Attended live fire demonstration of HK417 rifles at USMC Scout Sniper Instructor School.

Feb., 2006

- Met with two Major Officers of USMC Systems Command to discuss ammunition requirements.
- Conducted penetration and barrier test of Federal 9mm 147gr. HST. Modified ammunition test database.
- Conducted velocity testing of various munitions fired from an M4 carbine. Thereafter created ballistic charts showing projectile velocity and impact at various distances.

Jan., 2006

- Assisted multiple Govt. agencies with identification of projectile recovered from US service member in Iraq.
- Conducted gelatin test of Swift 75 gr. Scirocco with owner of Swift in attendance.
- Conducted test of body armor.
- Hosted meeting with representatives of ATK (Speer and Federal Ammunition).
- Hosted demonstration of SureFire suppressors.

Dec., 2005

- Conducted standard gelatin test of Black Hills .308 180gr. Accubond.

Nov., 2005

- Met with USMC Systems Command Lt. Col. and Major regarding proposed new USMC rifle and cartridge.
- Conducted ammunition testing informational meeting with personnel from Remington Ammunition.
- Conducted ballistic test of 9mm ammunition against human head model.

Oct., 2005

- Represented the FBI at the "Green Ammunition" meeting, Picatinny Arsenal, NJ.
- Conducted tour of BRF and provided ballistic demonstration for personnel from America's Most Wanted.
- Conducted test of the ability of Plexiglas to resist projectiles fired from a .22 LR.

Sept., 2005

- Conducted body armor test for DEA
- Consulted two NA students on wound ballistics, ammunition and weapon selection.
- Conducted high speed video for explosives unit
- Traveled to Pueblo, Colorado to conduct high speed video of explosive breaching for HRT.

Aug., 2005

- Conducted accuracy test of HK M4 type carbine.
- Participated in FBI firearms acquisition committee meeting.

July, 2005

- Conducted debriefing of manufacturer that participated in the .223 ammunition contract .
- May, 2005
- Conducted gelatin testing of subsonic .223 ammunition for government partners.
 - Provided wound ballistics and cartridge/weapon selection brief to Connecticut State Police and other NA Students.
 - Met with Universal Training Munitions to view their manufacturing facility in the United Kingdom and be briefed on their products.
 - Provided photographic assistance to FBI gunsmiths in photographing M4 parts.
 - Conducted High Speed video of M4 functioning for FBI Gunsmiths.
 - Briefed HRT on 6.8x43 SPC cartridge and capabilities.
 - Conducted gelatin and accuracy testing of .308 ammunition.
- April, 2005
- Consulted with Danish National Police and Special Forces on Wound Ballistics and ammunition selection.
 - Consulted with Swedish Defence Research Agency (FOI) on FBI method of ammunition selection, weapon selection and wound ballistics theory.
 - Consulted with the Stockholm County Police SWAT Unit on wound ballistics, ammunition and weapon selection.
- March, 2005
- Shot High Speed Video for Explosives Unit.
 - Shot High Speed Video of various projectiles impacting 40 lb. blocks of gelatin.
- Feb., 2005
- Conducted demonstration for officials from Jordan. Included live fire gelatin shots and discussion of wound ballistics.
- Dec., 2004
- Conducted High Speed Video for Explosives Unit.
- Nov., 2004
- Conducted body armor test for USASOC.
- Oct., 2004
- Conducted Pressure, velocity and accuracy testing of .40 S&W ammunition.
- Sept., 2004
- Represented the FBI at the Joint Services Wound Ballistics IPT meeting at Picatinny, NJ.
 - Shot vest test for HRT.
 - Hosted USASOC representative for meeting at the BRF.
- Aug., 2004
- Conducted Body Armor test for USASOC.
 - Tested frangibility of non-toxic ammunition on steel for HRT.
 - Met with USASOC representatives at Fort Bragg, NC.
 - Met with SA to discuss Fraud Against the Government investigation of RBCD.
- July, 2004
- Met with manufacturer of Body Armor to discuss FBI test methods.
 - Met with USASOC to discuss body armor test protocols.
 - Participated in conference call with Picatinny Arsenal regarding their round robin gelatin test.
- June 2004

- Represented the FBI at the Blended Metal Technology meeting at SOCOM in Tampa, Florida.
- Met with representative of Winchester ammunition.
- Tested ballistic plate for DEA.
- Conducted velocity measurements for FBINY SWAT.
- Represented the FBI at the SOCOM meeting on Blended Metal Technology ammunition, Tampa, FL.
- Hosted engineer from Crane NSW center to demonstrate the Stabalisor.

May, 2004

- Shot accuracy test of 7.62AA11 ammunition for USMC.
- Participated in meeting regarding .223 ammunition procurement.

April, 2004

- Conducted decibel test of various firearms for Health and Safety officer.

March, 2004

- Conducted HS Video for Explosives Unit.
- Observed MP5 shooting in attempt to diagnose malfunctions.
- Conducted tour for Inspector/head of training for Stockholm County Police, Sweden.
- Conducted tour for UK Govt. official.
- Met with Chief Warrant Officer, USMC Range Control, to discuss Surface Danger Zone issues aboard MCB, Quantico.

Feb., 2004

- Conducted HS Video of projectile impacts for the Firearms Toolmarks Unit, FBI Laboratory.
- Represented the FBI at Blended Metal IPT meeting, Tampa, FL.
- Conducted body armor test for FBI.
- Hosted USASOC personnel for visit.

Jan, 2004

- Met with NCIS Agent regarding Fraud Against the Govt. case.
- Demonstrated high speed video for FBI videography section.
- Captured Makarov projectiles in gelatin for investigation.

Dec., 2003

- Conducted body armor tests for FBI.
- Conducted body armor test for DEA.
- Conducted tour of BRF for FBI Laboratory personnel.

Nov., 2003

- Conducted testing of known munitions and provided High-Speed video of ballistic test for presentation at Snipemur trial.
- Requested by Prosecutor to provide expert witness testimony at Snipmur trial. Defense objected, due to prejudicial nature of video demonstrating projectiles impacting tissue simulant. Judge sustained the objection.

Oct., 2003

- Conducted demonstration of test protocol for Joint Services Wound Ballistic IPT
- Conducted accuracy and abuse testing of Sniper Rifles for procurement.
- Conducted gelatin test in support of Picatinny Arsenal.
- Conducted drop test of rifles submitted for FBI Sniper Rifle procurement.

Aug., 2003

- o Met with United States Secret Service to discuss .223 ammunition for their use.

July, 2003

- o Conducted Body Armor test for DEA.
- o Met with US DOD and Switzerland DOD representatives to discuss wound ballistics.
- o Shot gelatin test of 6.8x43 ammunition.
- o Conducted procurement testing of Rifles submitted for FBI Sniper Rifle procurement.
- o Participated as a member in a New Agent Review Board.

May, 2003

- o Represented the FBI at the Joint Services Wound Ballistic Workshop/meeting at Picatinny Arsenal, NJ.
- o Conducted testing of 6.8x43 SPC for 5th Special Forces (A).
- o Conducted body armor test for HRT.

April, 2003

- o Met with representatives of Glock to discuss malfunctions.

March, 2003

- o Conducted endurance testing for DEA/FBI 5.56 carbine procurement.
- o Conducted gelatin test for US Customs.
- o Conducted tour of BRF for visiting students.

Feb., 2003

- o Conducted testing for DEA/FBI 5.56 carbine procurement.
- o Assisted King George Deputy in analysis of problem with his Sniper Rifle.
- o Tested Gold Dot ammunition in Sig pistols.
- o Hosted Baltimore County SWAT officers to discuss Sniper training.

Jan., 2003

- o Conducted preliminary 6.8 SPC testing for Legal Review for 5th Special Forces Group.
- o Oversaw testing for joint FBI/DEA .223 Carbine Procurement.
- o Met with pistol and ammunition manufacturers to diagnose malfunctions the FBI experienced.

Dec., 2002

- o Met with ammunition manufacturer regarding performance of their product.
- o Shot gelatin test of .45 Auto ammunition.
- o Met with USMC personnel to discuss results of the test BRF conducted for them.

Nov., 2002

- o Assisted HRT with sight-in of rifles.
- o Conducted gelatin test of Schmidt Ruben for DOD JAG.

Oct., 2002

- o Core member of Joint Services Wound Ballistics Integrated Product Team.
- o Conducted alternate caliber gelatin testing for USMC.
- o Met with DEA regarding DEA/FBI 5.56 carbine procurement.
- o Conducted HS video for Harrisburg, Pa. FBI for use in Domestic Police Cooperation matter.
- o Hosted engineers from the USMC and Crane NSW to discuss test procedures.
- o Assisted USMC with pressure testing of ammunition.

Sept., 2002

- o Conducted FBI body armor test.

- o Conducted alternate caliber gelatin testing for USMC.

Aug., 2002

- o Conducted body armor test for DEA.
- o Conducted body armor test for FBI.
- o Designed and constructed a fixture to capture a projectile during an on-site test for reconstruction of a crime scene.
- o Attended meeting at Marine Corps Systems Command regarding ballistic testing they requested the BRF conduct.

July, 2002

- o Conducted pressure testing for USMC.
- o Conducted drop test of Springfield 1911 pistol.
- o Conducted body armor test for FBI.
- o Provided ballistic presentation at FBI PFI conference.
- o Provided ballistic demonstration for USMC PMO.

June 2002

- o As per U.S. State Department by-name request, attended meeting in Darligen, Switzerland to assist the United States in negotiations with other governments. The meeting was called to discuss ballistics research methodology, of which the US had been critical. Invitations were limited to acknowledged experts. The proposal was not only defeated but one participant (Sweden) appeared to have reversed its opinion as it's law enforcement officers subsequently began utilizing expanding ammunition and making decisions based on testing protocols which closely resemble those created by the FBI.
- o Conducted body armor test for HRT.
- o Met with Virginia State Police regarding .223 ammunition for LE use.

May, 2002

- o Met with FBI Operational Training Unit to discuss .45 Auto ammunition contract.
- o Met with USMC Systems Command to discuss testing.
- o Met with president of Armalite to discuss testing of their products.
- o Met with UK representative to discuss wound ballistics.
- o Conducted high speed video of explosions for the Laboratory Division.
- o Conducted body armor test for the FBI.
- o Conducted aerial photography in support of Stafford County, VA., Sheriff's Department investigation.

April, 2002

- o Represented the FBI during meeting at the Pentagon regarding frangible ammunition.
- o Conducted ballistic test of baffle materials planned for range construction.
- o Provided tour of BRF to members of the Ontario Provincial Police, Canada, and explained FBI test methods to them.
- o Met with ammunition manufacturers to discuss issues the FBI was experiencing.
- o Met with USMC Systems Command personnel to discuss ballistic testing.

March, 2002

- o Shot endurance test of Glock 19-C pistols.
- o Conducted high speed video of muzzle blasts for DEA.
- o Conducted pressure testing for USMC.
- o Attended Joint Nontoxic Working Group Meeting at HQ Army Material Command.

- Conducted body armor test for DEA
- Feb., 2002
- Visited Crane NSW to discuss M4 modifications.
 - Conducted aerial photography in support of Stafford County, VA., Sheriff's Department investigation.
- Jan., 2002
- Conducted body armor test for the DEA.
 - Hosted Crane NSW personnel for meeting on ballistic testing.
 - Assisted USMC with pressure test.
 - Conducted gelatin test of proposed lead free projectile for Picatinny Arsenal.
 - Met with DEA regarding .223 rifles.
- Dec., 2001
- Met with representative demonstrating the Galil rifle and carbine.
 - Conducted gelatin test for USMC.
- Nov., 2001
- Participated in meeting at the Department of Transportation to discuss specifics about enlarging the Federal Air Marshall Service.
 - Conducted high speed video of muzzle blast of suppressed M40A3 rifles for USMC.
 - Met with ammunition and firearm manufacturers to discuss malfunctions experienced by the FBI.
 - Met with Department of Energy personnel to discuss wound ballistics and selection of firearms and ammunition for their mission.
- Oct., 2001
- Worked at Strategic Information Operations Command, FBIHQ, in support of 911 investigation.
 - Met with US Air Marshalls in Atlantic City to discuss wound ballistics.
 - Conducted body armor test for DEA
- Sept., 2001
- Performed evidence recovery at the Pentagon in support of 911 investigation.
 - Conducted gelatin test for US Air Marshalls.
- July, 2001
- Conducted body armor test for DEA
 - Conducted test of soft shield, to include high speed video, for the FBI Practical Applications Unit.
 - Conducted .223 gelatin test.
 - Attended demonstration of frangible ammunition.
- June, 2001
- Shot aerial photographs for Stafford County, VA. Sheriff's Department.
 - Appointed as an FBI Contracting Officer's Technical Representative.
- May, 2001
- Debriefed ammunition manufacturers on recent ammunition procurement.
 - Conducted gelatin test at 200 yards for HRT.
 - Met with Pinellas County, Fl., Sheriff's Office personnel to discuss wound ballistics.
 - Met with ATF personnel to assist them with ammunition selection.
 - Conducted body armor test for HRT.

- Assisted with firearms instruction at FBIHQ qualification.

April, 2001

- Attended Shooting Incident Review Group as representative of the Firearms Training Unit.
- Conducted body armor test for HRT.

March, 2001

- Conducted high speed video of M4 muzzle flashes.
- Attended demonstration of Stabilizer return to battery rest at Blackwater, Moyock, NC.
- Met with US Customs Service personnel to provide advice on ammunition selection and writing of specifications.
- Conducted body armor test for the FBI.

Feb., 2001

- Conducted high speed video of Glock Pistols.
- Conducted test of soft shield for Practical Applications Unit.
- Conducted body armor test for DEA.

Jan., 2001

- Met with ammunition manufacturer representative regarding non-toxic shotgun and .223 ammunition.

Dec., 2000

- Met with representatives of the BATF to discuss restricted firearms.
- Met with Behavioral Sciences Unit to discuss testing conducted to support investigation of "Snuff Films"
- Conducted environmental testing for ammunition procurement.
- Conducted high speed video of re-creation of shooting depicted in "Snuff" film for the Behavioral Sciences Unit.
- Conducted body armor test for HRT.

Nov., 2000

- Met with Volusia County, Fl., officers to discuss wound ballistics.

Oct., 2000

- Conducted high speed video for Practical Applications Unit.
- Met with representative of the Ontario Provincial Police, Canada, to discuss .223 and .308 ballistics.
- Met with ammunition manufacturer's representatives regarding pistol and rifle ammunition for FBI use.

Sept., 2000

- Met with Hertfordshire, UK, police officer to discuss glass penetration of sniper rifle ammunition.

Aug., 2000

- Attended demonstration of TAVOR rifle.
- Conducted high speed video for Practical Applications Unit.
- Conducted MP5 training for USMC Range Control.

July, 2000

- Attended Armed Forces Institute of Pathology meeting on body armor and blunt force trauma.
- Met with ammunition manufacturer's representative about problems experienced with their product.

June, 2000

- o Conducted high speed video for Practical Applications Unit.
- o Conducted body armor test for HRT.

May, 2000

- o Met with ammunition manufacturer's representatives to discuss submissions.
- o Met with Albemarle County, VA., Police Department representatives to discuss .223 ammunition for LE use.
- o Conducted drop test of Springfield 1911.
- o Conducted high speed video for Practical Applications Unit.
- o Conducted high speed video for HRT.
- o Conducted high speed video for FBI Engineering Research Facility.

April, 2000

- o Conducted body armor test for HRT.
- o Conducted demonstration for visiting Medical Examiner's.

March, 2000

- o Conducted velocity test for Armed Forces Institute of Pathology, Medical Examiner's office.
- o Traveled to Killen, Tx., to be FBI on-sight firearms expert during re-enactment of infrared video of alleged small arms fired during the Waco siege.
- o Met with CWO5 from USMC Weapons Training Battalion regarding requested testing of suppressors.
- o Conducted special rifle training for overseas FBI personnel.
- o Conducted high speed video for FBI Practical Applications Unit.

Feb., 2000

- o Conducted high speed video for USMC to demonstrate the flex of the gas tube on M16 rifles during firing.
- o Represented Firearms Training Unit at FBIHQ Shooting Incident Review Group.
- o Represented the FBI at meeting of the Joint Nontoxic Working Group at the Federal Law Enforcement Training Center, Glynco, Ga.

Jan., 2000

- o Conducted body armor demonstration for the DEA.
- o Participated in Contract Review Board for ammunition contract.

Dec., 1999

- o Provided advice to INS personnel on accuracy testing.

Aug., 1999

- o Conducted tour of the BRF for the Irish National Police
- o Met with JD Jones and Ed Brown for demonstration of 300 Whisper cartridge.
- o Conducted gelatin test of Winchester 12ga. Slug.
- o Photographed tear gas delivery systems and cartridges for use in the Waco investigation.

July, 1999

- o Represented the FBI at the San Diego meeting of the Joint Nontoxic Working Group.
- o Conducted test of .308 ammunition for US Capital Police.

June, 1999

- o Conducted Gelatin test of Greenshield .223 ammunition for other Govt. Agency.
- o Conducted test of .223 ammunition for HRT.

- Participated in live-fire demonstration, precision and trick shots, for National Academy Graduation.
 - Assisted USMC with pressure testing of .223 ammunition.
- May, 1999
- Met with representative of rifle manufacturer regarding magazine problems experienced by the FBI.
- April, 1999
- Fired qualifying score on USMC Sniper Qualification Course.
 - Conducted body armor test for the FBI.
 - Conducted high speed video of function of a Glock pistol.
- March, 1999
- Conducted ballistic demonstration for USASOC.
 - Conducted glass testing of .50 caliber rifles.
 - Conducted gelatin test of 10mm Auto cartridges.
 - Conducted test of Kind & Knox vs. Vyse gelatin.
 - Conducted ballistics presentation for visiting Boy Scouts.
 - Conducted ballistic demonstration for National Academy class.
- Feb., 1999
- Conducted vest test for the DEA.
- Dec., 1998
- Participated in live-fire demonstration, precision and trick shots, for National Academy Graduation.
 - Hosted visit of Connecticut State Police to discuss Firearms Training and Wound Ballistics.
 - Represented Firearms Training Unit at FBIHQ meeting on ammunition procurement.
- Nov., 1998
- Met with FBI personnel regarding .223 ammunition.
- Oct., 1998
- Met with FBI SWAT personnel to discuss .308 ammunition contract.
- Aug., 1998
- Conducted demonstration for Michigan State University Police Officers.
 - Met with Contracting officers to discuss 1911 procurement.
 - Participated in familiarization fire of Barrett M82 .50 caliber Special Application Sniper System.
- July, 1998
- Conducted ballistic test for Office of Special Investigations.
 - Met with representatives of the Immigration and Naturalization Service regarding ballistic test protocol.
- June, 1998
- Conducted ballistic demonstration at the request of the FBI public affairs office.
- May, 1998
- Conducted body armor test for the DEA
- March, 1998
- Participated in live-fire demonstration, precision and trick shots, for National Academy Graduation.
- Feb., 1998

- Conducted ballistic demonstration for the USMC.
- Conducted ballistic demonstration for FBI contractors.
- Met with ammunition manufacturer to review new shotgun slug.

Jan., 1998

- Hosted demonstration of shotgun slugs.
- Hosted demonstration of high speed video equipment.
- Conducted ballistic demonstration for FBI Contract employees.
- Provided instruction in precision shooting to HRT Operator Trainees.

Dec., 1997

- Met with officials from Oak Ridge National Laboratory to discuss lead free ammunition and to provide them a tour of the FBI BRF.

Nov., 1997

- Hosted Remington demonstration of lightweight sniper rifle.

Oct., 1997

- Performed ballistic demonstration for Israeli officials.

Aug., 1997

- Conducted ballistic test of wall mockups for the USMC.

July, 1997

- Performed demonstration of body armor test protocol for the Department of Justice.

May, 1997

- Visited Remington, Federal and Winchester ammunition manufacturing facilities.
- Conducted testing of 1911 pistols for FBI procurement.

Performed as Acting Unit Chief:

July, 2010 June, 2010 Dec., 2009 Sept., 2009
FBI Defensive Systems Unit.

Aug., 2009 July, 2009 Dec., 2008 July, 2008
July, 2007 Dec., 2006 Aug., 2006 Feb., 2006
Nov., 2004 Aug., 2005 July, 2005
FBI National Firearms Program Unit.